DOCUMENT RESUME

ED 365 530 SE 053 950

TITLE	On the Right Track: The Consequences of Mathematics Course Placement Policies and Practices in the Middle Grades.
INSTITUTION	Educational Testing Service, Princeton, N.J.; National Urban League, Inc., New York, N.Y.
SPONS AGENCY	Edna McConnell Clark Foundation, New York, N.Y.
PUB DATE	Apr 91
NOTE	147p.
PUB TYPE	Reports - Research/Technical (143) -- Speeches/Conference Papers (150)
EDRS PRICE	MF01/PC06 Plus Postage.
DESCRIPTORS	*Ability Grouping; *Educational Policy; Ethnicity; Junior High Schools; Junior High School Students; *Mathematics Achievement; Mathematics Education; Middle Schools; Minority Group Children; *Performance Factors; Race; Racial Differences; Student Attitudes; *Student Placement; Teacher Student Relationship; Track System (Education)
IDENTIFIERS	Middle School Students; *On the Right Track Project

ABSTRACT

The four papers in this report summarize the major findings of the On the Right Track Project, a joint effort of the Education Testing Service and the National Urban League. The first paper, "Six Urban School Districts: Their Middle Grade Mathematics Grouping Policies and Practices" (Ruth B. Ekstrom), describes the six school districts and their policies and practices in regard to placing middle grades students for mathematics instruction. While several districts were trying, by the nomenclature used and the number of curriculum tracks offered, to reduce some of the effects of tracking, the result was to put more minority students into classes designated as low ability or emphasizing skill development. The second paper, "Parental Knowledge of the Participation in Placement and Tracking Decisions" (Roger D. Mitchell), focuses on issues of parent involvement in, and awareness of, the placement policies that affected their children. The third paper, "Middle Grade Students' Attitudes about Mathematics and Their Math Classes" (Richard J. Coley and Joyce V. Gant), deals with the consequences of grouping policies and practices in relation to student attitudes about mathematics, their mathematics classes, classroom experiences, their study habits, and their educational aspirations. The fourth paper, "Life in the Classroom: The Influence of Class Placement and Student Race/Ethnicity" (Ana Maria Villagas and Susan M. Watts), reports classroom observation data in life in these middle grades classrooms, including differences in: (1) teacher-student interaction and the types of mathematics being taught across high, middle, and low ability groupings; and (2) how teachers interact with white and minority students within each of these ability levels. (MDH)

ED 365 530

On the Right Track:

The Consequences of Mathematics Course Placement Policies and Practices in the Middle Grades

Report to the Edna McConnell Clark Foundation

Educational Testing Service
and
The National Urban League

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On the Right Track:

The Consequences of Mathematics Placement
Policies and Practices in the Middle Grades

Executive Summary

The four papers in this report summarize the major findings of the "On the Right Track" project, a joint effort of Educational Testing Service and the National Urban League, funded by the Edna McConnell Clark Foundation's Program for Disadvantaged Youth. The primary goals of this project were: 1) to investigate how middle grade students in six urban school districts were grouped or placed for mathematics instruction, and 2) to look at the consequences of these policies and practices, both in regard to students' attitudes about mathematics and in regard to their math class experiences. These four papers were presented as a symposium at the American Educational Research Association annual meeting in Chicago, IL on April 5, 1991.

The first paper provides the setting for this research. In it Ekstrom describes the six school districts and their policies and practices in regard to placing middle grade students for mathematics instruction. Each of the six districts had some process for separating students for mathematics instruction although several had policies to the contrary. Two districts had an official policy of heterogeneous grouping, but in one a small number of students were selected to take Algebra in addition to the General Math course taken by all students. In the other district, which acknowledged that some homogeneous grouping probably existed despite a policy to the contrary, there were three distinct instructional tracks and five levels of math instruction offered in grade 8. Two districts were involved in efforts to eliminate or modify tracking in the middle grades, but both still offered two or more levels of mathematics instruction. The remaining two districts had more rigid tracking systems. Every district used multiple criteria for course or track placement, usually tests and teacher recommendations, less often student or parent wishes. Considerable emphasis was given to scores from standardized achievement tests; often students were required to have high scores in two or more subjects in order to gain admission to the more advanced levels of mathematics. Such a policy seems unwarranted and may have differential impact on language minority students. While several districts were trying, by the nomenclature they used and the number of curriculum tracks or math levels offered, to reduce some of the effects of tracking, the result of their placement policies and practices was to put more minority students into classes designated as "low" ability or into classes which emphasized basic skills rather than more advanced mathematics.

The second paper focuses on issues of parent involvement. In it Mitchell describes what parents in these six school districts knew about district policies and about their own child's mathematics course placement. Although the parents were interested in their children's education and in school matters and wanted to be involved, they did not know how to access information from the schools effectively. The majority of parents were not fully informed about the districts' math placement policies and

practices. In addition, school policies and practices did not encourage parental involvement in the placement decisions. Many parents did not know what level of mathematics their child had been placed in. Because students and parents have the right and the need to know about the implications of ability grouping and tracking, the National Urban League has developed brochures which describes the process, how decisions are made, some of the implications of these decisions for students' futures, and proposed courses of action and resources for students and parents to help them make informed decisions on math courses and curriculum tracks.

The third paper deals with the consequences of mathematics grouping policies and practices in relation to student attitudes. Using data from student questionnaires, Coley and Gant discuss the relationship between math groups and attitudes about mathematics, attitudes about their math class, attitudes about their classroom experiences, their study habits, and their educational aspirations. The majority of students had positive attitudes about mathematics; however, students in classes designated as high ability were significantly more likely to say they liked math "very much" while students in classes designated as low ability were significantly more likely to say they disliked math "very much." About two-thirds of the students said that, in terms of difficulty, their math class was "just right" and three-quarters said their math class was interesting. Students in heterogeneously grouped math classes were significantly less likely to say that their class was "just right" in difficulty. Students in heterogeneously grouped math classes and in classes designated as high ability rated their classes as interested significantly more often than students in classes designated as middle or low ability. Although most students said they understood what their math class was about and why the things they were learning were important, students in classes designated as high ability were significantly more likely to say they understood what the class was about but significantly less likely to say they know why the things they were learning were important. Students in heterogeneously grouped math classes were significantly more likely to report their class as being "fun" than were students in the homogeneously grouped classes. Students in the heterogeneous classes and in classes designated as high ability were significantly more likely to report "a lot" of competition in their classes than were students in classes designated as middle or low ability. Students in the heterogeneous and low ability classes were significantly more likely to report poor relationships with their classmates, with some students fighting or refusing to mix with others. Students in classes designated as low ability were less involved in their work; they indicated they did not care about what went on in their class and that they felt left out of classroom activities; students in heterogeneous classes were also significantly more likely to report feeling left out of classroom activities. Students in the heterogeneous and high ability classes reported spending significantly more time on homework than students in the classes designated as middle or low ability. Educational aspirations were high; about seventy percent of the students said they expected to complete college and about forty percent said they expected to attend graduate or professional school. Students in classes designated as high ability had significantly higher aspirations than did other students.

The final paper provides a detailed look at life in these middle grade classrooms. Using data from classroom observations, Villegas and Watts explore how teacher-student interaction and the types of mathematics being taught differ across the classes designated as high, middle and low ability. They also explore how teachers interact with white and minority students within each of these ability levels. As indicated earlier, minority students were significantly more likely to be placed in classes designated as low ability while white students were significantly more likely to be placed in classes designated as high ability. Classes designated as low ability spent significantly more time receiving instruction in the basic arithmetic processes than did classes at the middle and high ability levels. Classes at the high ability levels spent significantly more time receiving instruction in algebra. Students in classes designated as high ability received significantly more academically-oriented information from the teachers than did students in groups designated as low ability. Students in the low ability groups received significantly more behaviorally-oriented comments from teachers than did students in the high ability groups. Thus, the students in the low ability groups had fewer academic opportunities than their high ability counterparts. These interaction patterns accentuate the inequalities in skills and knowledge that may have been present when the pupils were originally assigned to these classes. They are particularly disconcerting given the over-representation of minority students in the low ability classes. Within each ability group teacher-student interaction also differed. In classes designated as low ability, teachers spent significantly more time telling minority students what to do than white students. There was also significantly more teacher criticism of minority students than white students. In classes designated as high ability, however, a different pattern emerged. Teachers spent significantly more time providing information to white students than to minority students. These findings suggest that group level and race/ethnicity may work together to reinforce teachers' expectations and stereotypes about minority students.

Conclusions. Many middle schools continue to use grouping or tracking, even though it has been shown to have few, if any, educational advantages. Often these placement decisions are heavily influenced by standardized tests and little attention is given to parent or student wishes. National data (analysis of NELS:88) indicates that heavy emphasis is placed on test scores in just those situations where other indicators are likely to be more valid and more useful -- that is with urban and minority youth. The result in an over-representation of minority youth in classes designated as "low ability." When middle schools use grouping or tracking, minority youth suffer. They are more likely to be placed in so-called "low ability" classes where they receive less information from teachers and more criticism of their behavior. Students in these "low" groups report disliking math, not caring about what goes on in their math class, feeling left out of classroom activities, and having poor relationships with their classmates.

If urban middle schools wish to provide a quality education for all students, including minority and low-income pupils, it is important that grouping be ended. Among the educators interviewed as part of this study, many were convinced that instructional tracks should be eliminated. One major obstacle to doing so was fear of not knowing how to teach heterogeneous classes. Given the negative consequences of tracking, it is important that both in-service and pre-service teacher training programs

focus attention on effective alternative strategies to ability grouping. Eliminating tracking alone, however, is not sufficient to improve education for minority students. Middle grade teachers need to become aware that they often treat minority and white students differently, even within the same classroom. When grouping interacts with race/ethnicity and reinforces stereotypes about minority pupils, the education of all students suffers.

Paper prepared for the AERA Symposium, "On the Right Track:
The Consequences of Mathematics Course Placement
Policies and Practices in the Middle Grades"
Chicago, IL: April 5, 1991

Six Urban School Districts:

Their Middle Grade Mathematics Grouping Policies and Practices

Ruth B. Ekstrom

Educational Testing Service

Six Urban School Districts:
Their Middle Grade Mathematics Grouping Policies and Practices

Ruth B. Ekstrom

This paper describes some of the findings from the "On the Right Track" project. This project, a joint effort of Educational Testing Service and the National Urban League, is funded by the Edna McConnell Clark Foundation's Program for Disadvantaged Youth. The primary goals of the project were to:

1) investigate how middle school students are placed or grouped for mathematics instruction and

2) look at some of the consequence of these placement/grouping policies and practices.

We were especially interested in seeing if there are policies and practices that have negative consequences for minority youth.

In carrying out this project, we collected three different kinds of information:

- o Information about mathematics course placement policies and practices. Interviews with central office administrators in each district focused on district policies. Interviews with school principals and with math teachers focused on school and teacher practices. District and school documents were also reviewed.
- o Information about life in the classroom. We visited each target classroom to observe the composition of the class, what was being taught, and the instructional techniques that were being used. We also recorded classroom interaction patterns.
- o Information about students' attitudes, especially about mathematics and about their math classes.

All of the data collection was done by teams composed of individuals from both the Urban League and from ETS.

This paper describes the districts and the schools involved in this study; it tells how students are organized for mathematics instruction and the kinds of math available to them. The information about policies and practices for math course placement comes from interviews with central office staff in each district and with principals and math teachers in each school involved in this project.

Background

Before describing the districts and the schools, it is necessary to provide a context for this information. Tracking is the process of assigning students to a curriculum or a block of specified courses. Ability grouping is the process of assigning students to instruction on the basis of overall ability or ability in a specific subject area. Although within-classroom ability grouping occurs in elementary school, it is usually not until middle/junior high school that students are assigned to different courses or tracks on the basis of achievement or perceived ability. (Slavin, 1988). About 22 percent of schools serving young adolescents, such as junior high or middle schools, have ability grouping in all subjects and another 40 to 50 percent have grouping in some subjects (Braddock, 1990).

Often, tracking or ability grouping is not directed by district policy. Instead, decisions about grouping are left to school administrators, counselors, and teachers (Oakes, 1985). The basis for tracking and ability grouping is often students' past performance on tests and in courses; teacher and counselor recommendations as well as parent and student wishes are also often mentioned (Oakes, 1985). However, there is evidence that counselors

making curriculum assignments may be influenced by students' language, dress, and behaviors (Cicourel & Kitsuse, 1963).

The National Education Longitudinal Study (NELS) provides nationally representative information about students who were in Grade 8 in 1988 and about the schools they were in (Ingels et al., 1990). We have done some special analyses of this data to provide background for our study. Information about how middle/junior high schools assign students to high school courses is telling. Nationally, about 52 percent of all middle/junior high schools say they use standardized test scores to make such assignments. However, they report that teachers are most likely to have " a lot" of influence in course placements and that tests, parents and counselors have "moderate" influence.

Urban schools and schools with high minority enrollments appear to be more heavily involved in the use of tests for high school course placements. Sixty five percent of urban middle/junior high schools, such as those in our project, report using standardized tests to assign students to high school courses. Moreover, the extent of test use for such a purpose increases with the percentage of minority students in these urban schools; 58 percent of the schools with minority enrollments of 11 percent or less used standardized tests to assign students, as compared to 62 percent of the schools with minority enrollments between 12 and 64 percent, and 78 percent of the schools with minority enrollments of 65 percent or higher. In addition, the amount of influence which tests have in the course assignment decision also increases as the enrollment in urban schools that are more heavily minority while, in contrast, the amount of influence parents have over the assignment decision declines in schools with high minority populations.

This confirms what Oakes (1985) has reported; parents are rarely involved in course placement decisions. Parents are often not well informed about the kind of education offered in the different tracks or groups, nor are they told that the placements may result in different educational and employment opportunities. In the NELS data, only about a third of all parents with children in Grade 8 in an urban school said they had been contacted by the school about high school program placement decisions or about the courses their child would take in high school; parents of White children were somewhat more likely to report having been contacted by the schools than were the parents of African-American or Hispanic children.

The research evidence indicates that tracking and ability grouping are not beneficial to students (Bracey, 1987; Gamoran, 1987; Good & Marshall, 1984; Oakes, 1985, 1986; Oakes & Lipton, 1990; Rosenbaum, 1980; Slavin, 1989). Tracking limits access to knowledge and can result in poor self-concept and reduced aspirations, especially when students are placed in "low ability" groups. Despite this, these practices continue. The six urban school districts which we visited in this project are probably similar to many other districts in the United States.

Districts and Schools

The six urban school districts in this project were selected with input from the Edna McConnell Clark Foundation and from the National Urban League. Neither the districts nor the schools are intended to be representative of urban schools and districts in general; they were selected because they are places where efforts are underway to improve education in the middle grades. Because we promised each district anonymity we use pseudonyms not real names.

The six urban school districts in our study are listed in Table 1. These districts are:

- o Eastport - an east coast city. Eastport has middle schools that include grades 6, 7 and 8. Our project looked at two of these middle schools -- one a city-wide magnet school and the other a more typical middle school. About 66 percent of the students in the schools we studied are African American, about 18 percent are Hispanic, and about 9 percent are White.
- o Southport - a city in the southeast. Southport has middle schools that include grades 6, 7, 8 and 9. About 29 percent of the students in the two schools we studied are African American, about 42 percent are Hispanic, and about 17 percent are White.
- o Westport - a west coast city. Westport has junior high schools that include grades 7, 8 and 9. We looked at two schools -- one was a magnet school that also includes other grades while the other was a more typical junior high school. About 54 percent of the students in the schools we studied are African American, about 17 percent are Hispanic, and about 12 percent are White (These Westport schools also have a number of students of Asian-Pacific Island background).
- o Northport - a city in the northwest. Northport has middle schools which include grades 6, 7 and 8. About 14 percent of the students in the two middle schools we studied are African American, about 11 percent are Hispanic, and about 41 percent are White (These Northport schools also have a number of students of Asian-Pacific Island background).
- o River City - located on a river in the Mississippi-Missouri River system. River City has middle schools which include grades 6, 7 and 8.

We looked at three middle schools in River City. About 22 percent of the students in these schools are African American, about 17 percent are Hispanic, and about 51 percent are White.

o Lake City - located on one of the Great Lakes. There are no middle schools or junior high schools in Lake City; students of this age attend k-8 schools. Our project looked at grades 7 and 8 in two schools. About 19 percent of the students in the schools we studied are African American, about 23 percent are Hispanic, and about 37 percent are White (These Lake City schools also have a number of students of American Indian background).

Summary. These six districts present a range of middle grade education patterns. One district places the middle grades in elementary schools, one places these grades in junior high schools, and four place the middle grades in middle schools. Three of districts have middle schools that include grades 6, 7 and 8; one middle school includes grades 6, 7, 8 and 9. The junior high schools include grades 6, 7, 8 and 9.

Nationally, middles schools incorporating grades 6 though 8 are the most common school type for seventh graders; about 39 percent of all seventh graders are enrolled in this type of school. Other common school types for seventh graders are schools limited to grades 7 and 8, attended by about 25 percent of all seventh graders; junior high schools with grades 7 - 9, attended by about 17 percent of all seventh graders; and elementary schools with grades k-8, attended by about 9 percent of all seventh graders (Epstein, 1990).

The districts also vary considerably in the racial/ethnic composition of the schools we visited although there was considerable diversity in each

district. In three districts the schools were predominantly White, in two districts predominantly African-American, and in one district predominantly Hispanic. To give you some national urban school data (derived from NELS:88) for comparison purposes, about 54 percent of students in urban eighth grades are White, 21 percent are African American, 16 percent are Hispanic, and 8 percent are members of other minority groups (mostly Asian-Pacific Islander or American Indian). In our study River City comes closest to matching these national figures.

It is important to note that two of the schools we visited, one in Eastport and one in Southport, were magnet schools. We therefore expected that they might attract a somewhat different student population than would neighborhood schools.

Math Class Placement

Each of these six school districts has specific policies for assigning students to math classes. In some cases these policies are part of a system for assigning students to an "honors" or "advanced" program for all instruction or part of a system for assigning students to instructional groups or tracks. The policies and practices are summarized in Table 2.

Eastport. In Eastport there are two middle school program levels, called general and advanced. The advanced program, which enrolls approximately 1500 students middle school students city-wide, provides three years of intensive study in the academic disciplines for academically talented and highly motivated students. The advanced program is offered in two magnet schools serving the entire city; one of these magnet schools was observed for this project. The advanced program is also offered, along with the general program, in ten other middle schools. In still other middle schools, such as

the second school observed for this project, no advanced program is available.

If parents wish to have their child considered for the advanced program, they must apply when the student is in grade 5. Eligibility is based on specified criteria and available space. The criteria include standardized achievement test scores in both reading and mathematics at least two year above grade level; an overall grade point average of 85 or higher in grades 4 and 5; and 90 or better attendance in grade 5. Students who do not meet these criteria cannot be enrolled in the advanced program, regardless of parent wishes. Students in the advanced program take advanced math in grades 6 and 7 and must take algebra in grade 8. Students in the general program take general math in grades 6 and 7 and have the option of taking either algebra or general math in grade 8.

That is the official policy in Eastport. However, we found that in some schools practice diverges from this policy and that this occurs with the knowledge of the district administrators. In these schools the principals and math teachers often select some students from the general program and place them in advanced math; they also place some students from the advanced program in general math. These decisions are based primarily on the students' tested math achievement; students who are two or more years above grade in math are placed in advanced math even if their reading achievement does not meet the criteria for the advanced program. The schools meet with parents when they are considering changing students' math placement. Parents can request a different math placement for their child but the final decision rests with the math teacher.

Southport. In Southport there is one specified curriculum for grades 7 and 8 but there are three levels of language arts and math instruction (basic,

regular, and advanced) within this curriculum. While the district does not see these levels as ability groups, they admit that it is unlikely that a student would take language arts at the advanced level and math at the basic level. It is up to the principal in each school to decide what levels of mathematics instruction are to be offered. There is no district-wide policy governing student placements. The district sees placement as a four-step process involving student choice, parents' choice, teacher recommendation and the guidance counselor, with the parents having the final decision. The usual criteria for placement level include scores on an achievement test, grades, and teacher recommendations, with the weight given to each criterion varying by school. Placement in math courses is also made in different ways, depending on the school. Some schools use a pre-test to place students for math instruction; others assign students randomly to math classes and then group them within the classroom according to ability level.

One of the Southport schools which we observed grouped students into teams for instruction in language arts, math, social studies and science, Students stay in the same team for all subjects. Math ability drives the team configuration, with students of similar math ability being grouped together. According to teachers, these teams can be considered as "skill grouped" rather than ability grouped. The math placement decisions are made on the basis of achievement test scores, teacher recommendation, and grades (including academic grades, effort grades, and work habits). On the achievement test, students scores in the top three stanines are considered "high performing", those in the middle three stanines as "regular", and those in the lower three stanines as "basic". When students are borderline, the school places them in the more challenging level. This school has basic, general and advanced math

courses for each grade except grade 7 where the basic math course has been eliminated. In addition, Algebra 1 Honors is offered in grade 8, primarily for students who were in the seventh grade advanced math class and received an A, B, or C. In grade 9 students may take Algebra 1 (which is considered a regular level course) or Pre-Algebra (which is considered a below level course); Geometry Honors is offered in grade 9 for students who passed Algebra 1 in grade 8 with an A, B, or C.

Westport. In Westport the school district policy is that there will be heterogeneous grouping. However, as the district office acknowledged, in practice there may be homogeneous grouping in some schools.

The two schools we observed in Westport differed considerably in how students were placed for mathematics instruction. In the magnet school, students in the middle grades (4 through 9) are organized in multi-grade classes for mathematics; this across grade grouping is one alternative to grade-by-grade ability grouping. In the other middle school students' math scores on a standardized achievement test are used to determine recommended math class placement. In addition, an algebra prognosis test is used to guide placement of students in the more advanced math courses. In this school there are three levels of math in grade 7 (below average, average, and pre-algebra), five levels of math in grade 8 (low below average, high below average, average, pre-algebra, and Algebra 1), and six levels of math in grade 9 (low ability general math, high ability general math, Algebra 1, Algebra 1 Honors, Geometry, and Algebra 2).

The Westport district has adopted, as official policy, activities to maximize the enrollment of students in algebra in grade 9. This policy includes emphasizing preparation for algebra in grades 6, 7 and 8 and

emphasizing that taking Algebra 1 in grade 9 should be the norm not the exception. The policy bulletin on this topic states " No single criteria or set of criteria, such as an achievement mark, a standardized test result, or another screening tool, or a teacher recommendation, may be used to determine placement of a student in Algebra 1. ... No student may be denied access to Algebra 1." Thus, some of the practices we observed are at odds with this policy. District-wide follow-up studies indicate that algebra enrollments have increased since this policy was initiated. However, while the increase in algebra enrollments has been greatest at schools with large minority enrollments, only about 20 percent of the ninth graders in these schools now take algebra, as contrasted with nearly 60 percent of ninth graders in the district's magnet schools.

Northport. The Northport schools track students for instruction throughout elementary, middle school and high school. The two major tracks are regular and advanced. The advanced track is reserved for the academically top five percent of the students in the district. To be eligible for this track, students must score at or above the 90th percentile on the math, language and reading portions of a standardized achievement test; they must also take a non-verbal test. Because the district is concerned with maintaining a equitable racial, social class and gender balance in the advanced track, the advanced program admits a limited number of students who do not meet the achievement test criterion but who do well on the non-verbal test. All students in the district who are not in the advanced track are in the regular track.

Access to the advanced track begins with the administration of a standardized achievement test. Parents of students who receive high scores on

this test are sent a letter asking them to nominate their child for the advanced program. Teachers are also asked to nominate students for this program. The nominated students then take the non-verbal test. A committee, consisting of a teacher, an administrator, and a psychologist select "eligible students" from the pool of candidates. Parents are informed of the results and must give their consent for those who are eligible to enter the program. There is a review process if parents wish to appeal the decision.

In addition to the two tracks, the district also has two distinct placement levels in mathematics -- regular and honors. In theory these are separate from the regular and advanced tracks. However, nearly all advanced track students are placed in the honors math program and nearly all regular track students are placed in the regular math program. Entrance into the honors math program is based on scoring at or above the 90th percentile on a standardized achievement test and on teacher observations. It is expected that not more than 15 percent of grade 7 students will be in the honors math program. In grade 8 students in honors math begin a three-year integrated mathematics sequence which combines topics such as logic, algebra, geometry, and probability. Students in the regular grade 8 math program work on topics involving the use of skills in "real life" applications.

River City. The middle schools in River City have three curriculum tracks, designated as advanced, honors and regular. Although these tracks are mandated in both local and state policy, individual schools have considerable flexibility in how the policies are implemented. An achievement test is used to identify students who might be placed in the advanced program, then selection is based on teacher and staff recommendations, with parent approval. Students are recommended for the honors program by teachers and staff but

parental approval is also required. Students in the advanced program take algebra and geometry.

However, in each of the three middle schools we observed, we found only two curriculum tracks -- these were designated honors and general. In each school the students in the honors track take algebra in grade 8. The process for entering the honors track differed somewhat from school to school. According to one school, track decisions are made at the elementary school level, based on stanine scores from a statewide standardized test (students with stanines of 5 or higher are usually placed in the honors track). In this school a second decision point comes at the end of grade 7; a test is used to decide which students will take algebra in grade 8. In the second school, students are selected for the honors course by use of a standardized test and, among the honors students, an algebra prognosis test is used to decide who will take algebra. In the third school, prior to this year track decisions were made by teachers, guidance counselors, and students, and with parental permission. Track decisions were based on the student's previous year's scores on an achievement test. However, this school is now moving toward heterogeneous grouping of students.

Interviews with the math teachers indicated considerable variation in math class placement policies and practices in River City. While all of the teachers agreed that there was grouping for mathematics instruction, there were many interpretations of what these groups were or meant. About a third of the teachers saw them as ability groups. Others saw them as curricular tracks, as "not necessarily tracks", as neither tracks or ability groups, or as random groups. Approximately half of the teachers said the students were assigned to their class randomly or were in heterogeneous teams/groups;

approximately half of the teachers said the students were assigned to their classes on the basis of ability, with test scores being the criterion most often mentioned.

Lake City. In Lake City all classes in grades k - 8 are grouped heterogeneously and are balanced by sex, race, language and test scores. Students are placed in a heterogeneous class in the lower grades and tend to stay with this class for several years. Thus, all grade 7 and 8 math classes observed for this project were heterogeneous in composition and the content emphasized general math. The observations found no consistent pattern of within class grouping in either school.

Because the state mandates that accelerated math be available to students in grade 8, Lake City arranges for approximately 4 to 5 percent of eighth grade students to take an additional mathematics course at the high school each morning before starting their regular school day. These students are selected for this on the basis of maturity, attendance, grades, classroom tests, standardized tests and teacher recommendations. Students who are selected may choose not to enroll and students not selected may enroll if they and their parents wish to have them do so. We did not observe these special algebra classes since they were not held in the schools we were visiting. However, we do include the Lake City selection process for these algebra classes in our discuss of math selection/placement processes.

Summary. There are many different policies governing tracking and student placement in these six school districts and, in addition, there are school-to-school variations in the extent to which these policies are put into practice. In each district standardized achievement tests were used as a selection criterion. In two districts an algebra prognosis test was used in

addition to an achievement test, one district used a non-verbal test in addition to the achievement test, and one district used classroom test results to supplement those from the achievement test. Teachers were also involved in the placement decision in every district. Most frequently teacher recommendations were used. In two districts both classroom grades and teacher recommendations were used in the placement decision. In most, but not every case, parents had the opportunity to participate in the placement decision. However, parental over rule of placement was not possible in Eastport. Two districts also took attendance into consideration and one also considered student maturity.

The emphasis on standardized test scores in assigning students to different curricula or math classes is a matter of some concern, especially when students must achieve high scores in several subjects in order to gain access to the "Fast Track". This can be especially unfair to language minority students who may do well in math but have more problems with reading. Other students, too, with differential abilities across subjects are likely to be penalized by such an assignment policy. While none of the six school districts relies entirely on test scores to place students, in several much more emphasis appears to be given to tests than to other achievement criteria (such as grades), to teacher recommendations, or to parent wishes. As mentioned earlier, national data (NELS:88) shows a similar pattern heavy reliance on tests when junior high/middle schools assign students to high school courses.

Types of Math Taught

The various math placement policies and practices are related to the kinds of mathematics that is taught to the students. The different types of

math available to eighth grade students in these six school districts is shown in Table 3.

In Eastport all eighth grade students in the Advanced curriculum must take Algebra while students in the General curriculum may take either General Mathematics or Algebra.

In the Southport schools the eighth grade students in the Advanced group take either Algebra Honors or Algebra, while the students in the Regular group take Pre-Algebra, and the students in the Basic group take either General Math or Basic Math.

In one of the Westport schools we found there were three levels of math in grade 7, five levels in grade 8, and six levels in grade 9. The math options for eighth graders include Algebra, Pre-Algebra, High General Math, Average General Math, and Low General Math. As mentioned earlier, the magnet school in Westport used across-grade grouping for mathematics instruction.

In Northport the eighth grade students in the Honors track take the first year of a three-year Integrated Mathematics sequence, which includes Logic, Algebra and Geometry. Regular track students may take Math 8 Honors or Math 8.

River City, like Northport, has an Integrated Math course, combining Algebra and Geometry, available to students in the Advanced Group. And, as is the case with Northport, this Integrated Math course is the beginning of an Integrated Math sequence. Honors group students in River City may take either Algebra or Honors Math; all students in the Regular group take General Math.

Lake City has the most consistent mathematics program; all eighth grade students take General Math. However, a small proportion of eighth grade

students also take a course in Algebra at the high school in addition to their "regular" math course.

Summary. There are wide variations in the types of math available to eighth grade students in these districts, both according to the curricular track in which the student has been placed and, often, within curricular track as well. Algebra was available to all students in the higher level tracks or classes. The lower level tracks or classes were most often studying General Math.

Two of the districts make algebra accessible to all students. In Eastport all Grade 8 students in the Advanced curriculum must take algebra and algebra is also available to students in the General curriculum. In Westport the district has stated a policy that algebra should be the normal math course for students in Grade 9. In the other districts access to algebra is more restricted.

Who Gets into Which Track/Ability Group?

We asked each school that had grouping to allow us to study, at each grade level, three high, three middle and three low ability classes to the extent that this was possible. (In some schools there were only two math classes at each grade level.) If schools said they had no grouping we asked for classes in different kinds of mathematics to the extent that they were available. We determined the level of each class by asked the teacher in charge.

Table 4 shows the percentage of observed students in classes designated as being "high ability", "middle ability", "low ability", or "ungrouped. It is important to point out that the schools rarely used these exact terms; we use them here to provide a comparison across the districts. Overall, about 42

percent of the students were being taught in classes designated as "high ability", 33 percent in classes designated as "middle" ability, and 15 percent in classes designated as "low"; approximately 10 percent were receiving instruction in ungrouped math classes.

The relatively high proportion of students in classes designated by the teachers as "High ability" should come as no surprise when we recall that four of the six districts had an "Advanced" curriculum and in two districts one of the schools observed was a magnet school. Neither should the relatively small percentage of students in classes designated as "Low ability" come as no surprise when we recall that only one school district had a "Basic" curriculum track (although there was a "Basic" curriculum in one school in another district). The reduction in the number of classes designated as "Low ability" appears to be part of a national trend. According to student questionnaire responses from NELS: 88 nearly 80 percent of urban eighth grade students say they are grouped for math; of these about 40 percent say they are in a high ability group, 50 percent say they are in a middle ability group, and 10 percent say they are in a low ability group.

Before presenting the data on the racial/ethnic composition of the math classes at each ability level, I want to emphasize that the overall distribution of students to classes is determined both by the policies and practices in place in each of the districts/school and by the racial/ethnic composition of that district/school.

Averaging across these six urban school districts, we found that fifty four percent of the White students were in classes designated as high ability, as compared to 45 percent of the African American students and 34 percent of the Hispanic students. This suggests that the some of the processes used to

assign students to the math classes may be inappropriate for minority students. One example of this is policies which require language minority students to be excellent in English as well as in math in order to be placed in a "high ability" math class.

It seems unlikely that the district/school policy by racial/ethnic composition interaction alone is responsible for this apparently inequitable pattern of math class placements since the two districts which had magnet schools and, therefore more high ability classes, were also districts with large enrollments of African American students. While students in classes designated as low ability are less likely to be able to identify their math group correctly than are students in classes designated as high ability (Coley and Grant, 1991), this difference does not appear to be large enough to account for the relatively small proportion of students in classes designated as low ability.

Summary. The districts appeared to be trying, both by the nomenclature they used and the number of curriculum tracks/levels offered, to reduce some of the effects of tracking. Two districts had only two district levels, advanced and regular; another had advanced, honors and regular levels. While this is not quite like Lake Woebegone, where all children are above average, it appears that many of the districts and schools are reluctant to designate children as below average.

Despite these efforts, the result of the placement policies and practices is to put more minority students in classes designated as "low" ability or in classes were the emphasis is on basic math skills. This finding is similar to what has been found by Braddock (1989) and others.

Discussion and Conclusions

Each of the six urban school districts we visited had some process for separating middle grade students into ability groups for math instruction.

Two districts, Lake City and Westport, had an official policy of heterogeneous grouping. However, although all Grade 8 students in Lake City took General Math, a selected few (approximately 5%) also took Algebra. Westport officials acknowledged that although district policy was to have heterogeneous grouping, some homogeneous grouping existed. We observed this at a Westport junior high school which we visited; there were three distinct instructional tracks and by Grade 8 five different levels of math instruction were offered.

Two districts had a policy of providing instruction at different levels but were involved in efforts to reduce or modify tracking. In Southport, although middle school students are divided into advanced, regular and basic level "teams" for instruction, central office staff say that one of their goals is to eliminate tracking in the middle schools. In River City, although advanced, honors, and regular tracks are mandated by both the state and the district, some middle schools are interpreting this mandate in a flexible manner. One of the three schools is moving toward heterogeneous grouping of students for math instruction while the two others have only two instructional levels -- honors and general.

The remaining two districts have more rigid tracking patterns. This is openly acknowledged in Northport where there are regular and advanced tracks for instruction at all grade levels. In Eastport, which has a similar two track system, district officials state that they have a single curriculum but adapt it to two types of students.

Every district put a good deal of emphasis on test scores in assigning students to curriculum tracks or to math instruction groups. In most cases the tests used were standardized achievement tests, not state or local tests that would probably be more curriculum specific. In many cases test scores from two or more subjects were used to determine curriculum or math class placement. This makes little sense. Students do not have to be excellent readers to be excellent in math, or visa versa. If there is any benefit from instructional grouping of students with similar ability or skill in a subject, much of that benefit is likely to be lost when several test scores are averaged to create tracks.

While no district had a policy of using a test score as the sole criterion for course placement, the practice in at least one school came perilously close to this. Over-reliance on tests as a single indicator has been warned against the National Commission on Testing and Public Policy (1990) report as well as in test use guidelines (e.g., Joint Committee on Testing Practices, 1988). Good test use practice stresses the avoidance of using a single test score to make decisions about an individual (Elmore et al., 1988); test users are encouraged to supplement test scores with other information about individuals, such as that available from grades or teacher recommendations.

A recent article in Education Week (Armstrong, 1991) has indicated that the Federal government is becoming concerned about ability grouping practices, especially when they appear to be fostering segregation, cannot be justified on educational grounds, use subjective criteria, or group students without giving them a choice. Some of the six school districts in this study may be vulnerable on one or more of these. However, there are activities in each

district to reduce tracking and to increase student access to important math topics such as algebra. It seems likely that if we were to go back to these districts again in a few years we would find less tracking and greater progress toward the goal of providing an excellent education for every child.

References

Armstrong, L. S. (1991). Draft O.C.R. memo outlines grounds for probling ability-grouping practices. Education Week, 10 (22), 21 - 22.

Bracey, G. W. (1987). The social impact of ability grouping. Phi Delta Kappan, 68 (9), 701 - 702.

Braddock, J. H. (1989). Tracking of Black, Hispanic, Asian, Native American, and White Students: National Patterns and Trends. Baltimore: Johns Hopkins University, Center for Research on Effective Schooling for Disadvantaged Students.

Braddock, J. H. (1990). Tracking in the middle grades: National patterns of grouping for instruction. Phi Delta Kappan, 71 (6), 445 - 449.

Cicourel, A. V. & Kitsuse, J. I. (1963). The Education Decision-Makers. Indianapolis: Bobbs-Merrill.

Elmore, P. B., Diamond, E., & Ekstrom, R. B. (1988). Using tests responsibly in counseling. Paper presented at the annual meeting of the American Association for Counseling and Development, Chicago, IL, March 20 - 23.

Epstein, J. L. & MacIver, J. D. (1990). Education in the Middle Grades: Overview of National Practices and Trends. (Report #45). Baltimore: Johns Hopkins University, Center for Research on Elementary and Middle Schools.

Gamoran, A. (1986). Instructional and institutional effects of ability grouping. Sociology of Education, 59 , 185 - 198.

Good, T. L. & Marshall, S. (1984). Do students learn more in heterogeneous or homogeneous classes? In P. P. Peterson, L. C. Wilkinson, & M. Hallinan (Eds.), The Social Context of Instruction. New York: Academic Press.

Joint Committee on Testing Practices (1988). Code of Fair Testing Practices in Education. Washington, DC: Author.

McPartland, J., Coldiron, J. R., & Braddock, J. H. (1987). Schools Structures and Classroom Practices in Elementary, Middle, and Secondary Schools. (Report #14). Baltimore: Johns Hopkins University, Center for Research on Elementary and Middle Schools.

National Commission on Testing and Public Policy (1990). From Gatekeeper to Gateway: Transforming Testing in America. Chestnut Hill, MA: Author.

Ingles, S. J., Sameer, Y. A., Rasinski, K., Karr, R. Spencer, B. D. & Frankel, M. R. (1990). National Education Longitudinal Study of 1988. Base Year: Data User's File Manuals. Washington, D.C.: National Center for Education Statistics.

Oakes, J. (1985). Keeping Track: How Schools Structure Inequality. New Haven: Yale University Press.

Oakes, J. (1986). Tracking, inequity, and the rhetoric of school reform: Why schools don't change. Journal of Education, 168 (1), 60 - 80.

Oakes, J. & Lipton, M. (1990). Tracking and ability grouping: A structural barrier to access and achievement. In J. I. Goodlad & P. Keating (Eds.), Access to Knowledge: An Agenda for Our Nation's Schools. New York: College Entrance Examination Board.

Rosenbaum, J. E. (1980). Social implications of educational grouping. In D. C. Berliner (Ed.), Review of Research in Education, 8. Washington: American Educational Research Association.

Slavin, R. E. (1989) Effects of ability grouping on Black, Hispanic, and White students. Baltimore: Johns Hopkins University, Center for Research on Effective Schools for Disadvantaged Students.

Slavin, R. E. (1988). Synthesis of research on grouping in elementary and secondary schools. Educational Leadership, 46 (1), 67 -77.

"On the Right Track"

Six Urban School Districts:
Their Middle Grade Mathematics Grouping Policies and Practices

Table 1
Districts and Schools

District	Organization & Grades	Schools	Race/ethnicity of students in schools
Eastport	Middle Schools Grades 6, 7, and 8	2 schools; 1 magnet, 1 regular	66% African American 18% Hispanic 9% White 7% Other
Southport	Middle Schools Grades 6, 7, 8, and 9	2 schools	29% African American 42% Hispanic 17% White 12% Other
Westport	Junior High Schools Grades 7, 8, and 9	2 schools; 1 magnet, 1 regular	54% African American 17% Hispanic 12% White 17% Other
Northport	Middle Schools Grades 6, 7, and 8	2 schools	14% African American 11% Hispanic 41% White 34% Other
River City	Middle Schools Grades 6, 7, and 8	3 schools	22% African American 17% Hispanic 51% White 10% Other
Lake City	Elementary Schools Grades 7 and 8	2 schools	19% African American 23% Hispanic 35% White 23% Other

"On the Right Track"

Six Urban School Districts:
Their Middle Grade Mathematics Grouping Policies and Practices

Table 2
District Policies and School Practices

District	Curricula/Track Policy	Practice and Criteria
Eastport	Advanced Regular "There is only one curriculum but it is adapted to two types of students"	Approximately 500 students per grade are selected for the Advanced program. Criteria: Standardized achievement test scores in reading and math at least 2 years above grade level; Gradepoint average of 85 or higher in grades 4 and 5; Attendance 90% or better.
Southport	Advanced Regular Basic "One of the goals of the middle schools is to eliminate tracking."	Standardized achievement test scores, grades and teacher recommendations used to place students in "teams" for instruction.
Westport	"District policy is heterogeneous grouping; taking algebra in grade 9 should be the norm; no single criterion may be used to place a student in algebra."	Standardized achievement test used to place students in below average, average, and pre-algebra math for grade 7; algebra prognosis test used to guide placement in advanced math. Across grade grouping in magnet school.
Northport	Advanced (Honors) Regular	No more than 15% of students in advanced/honors program. Criteria: Score at or above 90th percentile on math, reading and language arts portions of a standardized achievement test; a non-verbal test is also used.
River City	Advanced/Gifted Honors Regular	Standardized achievement test scores, grades, teacher and principal recommendations.
Lake City	Heterogeneous grouping	Approximately 5% of grade 8 students are selected to take an additional advanced math class. Criteria: attendance, maturity, grades, classroom and standardized tests, and teacher recommendations.

"On the Right Track"

Six Urban School Districts:
Their Middle Grade Mathematics Grouping Policies and Practices

Table 3
Types of Math Taught in Grade 8

District	Curricula	Math Courses
Eastport	Advanced	Algebra
	General	General Math or Algebra
Southport	Advanced	Algebra Honors Algebra
	Regular	Pre-Algebra
	Basic	General Math Basic Math
Westport*	Enriched	Algebra Pre-Algebra
	Regular	High General Math Average General Math
	Basic	Low General Math
Northport	Honors	Integrated Math Honors (Logic, algebra and geometry)
	Regular	Mathematics 8 Honors Mathematics 8
River City	Advanced	Integrated Math (Algebra and geometry)
	Honors	Algebra Honors Math
	Regular	General Math
Lake City	[No grouping]	General Math (About 5% of students take a second math class, an algebra course taught at the high school)

* Regular junior high school only; across grade grouping in the magnet school

"On the Right Track"

Six Urban School Districts:
Their Middle Grade Mathematics Grouping Policies and Practices

Table 4
Percentage of Students in Each Math Track/Group
in Observed Schools

	High	Middle	Low	Ungrouped
Eastport	55.0	24.8	20.2	0
Southport	37.5	35.8	26.7	0
Westport	50.3	27.6	22.1	0
Northport	44.2	52.6	3.2	0
River City	49.8	42.5	7.6	0
Lake City	0	0	0	100
Total	42.5	32.5	15.1	9.9

Paper prepared for the AERA Symposium, "On the Right Track:
The Consequences of Mathematics Course Placement
Policies and Practices in the Middle Grades"
Chicago, Illinois April 5, 1991

Parental Knowledge of, and Participation In Placement and Tracking Decisions

Roger D. Mitchell
National Urban League

Introduction

On the issue of parental involvement in their children's education, school administrators and teachers often get caught in the "alternating current syndrome." On the one hand, they applaud the parents who help their children with homework, see that they attend school regularly, control their behavior, and assist the school with fairs, bake sales, and attend parent/school meetings. On the other hand, many school/administrators and teachers are opposed to parental involvement in school management, curriculum planning, and the course assignment or tracking of students.

Despite almost universal consensus that parent involvement is a key element in the academic success of their children, the majority of parents of students in junior/middle and high school grades are effectively discouraged from participating in the academic decisions on their child's classes. On the issue of ability grouping, Oakes found that none of the junior high schools in her study involved the parents of students in placement decisions. Counselors had the sole responsibility for placement decisions in two junior high schools, teachers the sole responsibility in two other schools, with counselors and teachers sharing the responsibility in the remaining schools.

At the high school level, Oakes found that only three out of twelve high schools involved parents and students in placement decisions. Oakes (1981) states:

> Parents and students are often not informed as to placement criteria, about the differences in educational treatments offered

to different groups, or of educational or occupational opportunities which may result from various placements. Moreover, in some districts and schools, parents are not routinely informed that their children are being classified and tracked.

Involvement of parents appears to differ across racial/ethnic lines. Ekstrom (1985) found twenty percent of White high school sophomores reported their parents had been involved in making a curriculum-track decision for their child, while only ten percent of Black students and eight percent of Mexican American students reported such involvement.

This paper presents responses collected from parents as part of the "On the Right Track" study conducted jointly by the Educational Testing Service and the National Urban League. Parent meetings were scheduled in each of the six research site cities for the parents of children in the middle school mathematics classes that were the target of this project. The purpose of the meetings was to determine how much the parents knew about the district and school policies and practices for tracking and math grouping the sources from which they obtained their information and, the level of their participation in the decision-making.

Parent Selection

Each family of the approximately 2000 students targeted for inclusion in the study was sent a letter inviting the parents and/or other family members to an off-school site meeting to discuss parents' knowledge of and

involvement in placement/tracking decisions. To maintain family confidentiality, the six school districts took the responsibility for transmitting the invitations to the families.

Data Collection Format and Procedures

Data was collected from parents using a focus group format. The groups were scheduled in the evening at local Urban League facilities. The Urban League and/or ETS researcher at each site administered a 23 item questionnaire developed by ETS. Responses were recorded manually by the researcher. A tape recording was also made of each session as a backup to the manually recorded responses. Focus group response surveys from each site were read and analyzed manually.

Findings

Due to the relatively small size of the parent sample, the responses are considered to be anecdotal. However, the comments and concerns of these interested parents provide a valuable perspective.

All of the parents expressed the belief that education is important to prepare their children for the future, especially for "a better job and a better life." They also saw math as an important part of education. "The professions require math." "Math helps you run your own life and your financial affairs."

Many of the parents attending the focus group meetings were not aware there was any choice of math available to eighth grade students, although they were aware of the different levels of courses, basic through

honors. One parent noted that while it is against the policy of the district to track students by ability level, "it is going on. I saw it listed in the counseling office." All of the parents believed that the level in which a student is placed makes a difference. Comments included, "the enriched program has more options of things to study, and that "students need to be in the proper level to facilitate learning success." Others said, "In the basics the slower kids can move at their own pace, in honors students aren't held back."

Parents with children in a magnet school had more information then parents with children in a "regular" school. Parents of students in a magnet school reported knowing that there were different levels of math, and that students are placed on the basis of test scores, grades, and teacher and counselor recommendations. Other parents said they were not consulted about the math placement level. In one group, although one parent had a child in the advanced math course, none knew how the school district decides which students will be offered the opportunity to take advanced math while in eighth grade. According to the parents in another group, there was no consultation about which program the child would be in. "It's pre-set by the schools."

The quantity and quality of information provided by schools to parents varied among districts. In one district parents said they routinely received information from the schools. This included newsletters, grade reports, and information on open house programs or other special events. The schools also provide information each semester about the course offerings available. Some parents attended Guidance Nights to get information about courses and to have a discussion with school staff. Most parents in this group said the

information provided by the schools was clear, important and helpful. "If I don't understand it I can call a counselor."

The other focus groups reported also receiving newsletters, progress and grade reports from the schools. They also mentioned things such as PTA meetings, fund raisers, and class trips. Some mentioned hearing from the school on their child's attendance or behavior problems. The parents differ in their opinion about whether or not they got adequate information from the schools about the choices available for their child, or adequate information to help make a decision about courses and programs. Some complained that they did not have a chance to review decisions before they were made by the school. Others found the information that they received from the schools about the choices available to their children to be confusing. Most parents felt that the schools were responsive "if you push the issues." Many parents reported that their children were their main source of information about courses and placement.

Parents were asked what other information they would like to receive from the school, in addition to information on their child's course assignments and placement. The following items were mentioned:

-A letter from the teachers about what the student is doing and telling what is expected of them.

-Start providing information on high school choices when students are in seventh grade.

-How parents can volunteer in the schools.

-Information on the negative things going on in the school, such as problems with staff, students, academics, and money. It's important to know what the problems are because it effects the way the school is operating. Also, parents may be able to come up with some solutions.

Summary

-The majority of parents are not fully informed about math placement policies and practices

-Many parents do not know their own child's placement.

-School policies and practices do not encourage parent involvement in placement decision-making

-Parents are interested in their child's education and school matters, and want to be involved.

-Parents do not know how to effectively access information from schools.

Followup

Based upon discussions with parents in the focus groups, and the apparent lack of information available to parents as reported in the research literature, student and parent brochures on ability grouping and tracking have been developed by the National Urban League. Both students and parents have the right and the need to know about the practices and implications of ability grouping and tracking.

The parent brochure is entitled "On The Right Track: What Can Parents Do to Help Their Children Succeed in School?" The student brochure

is entitled, "On The Right Track: What Students Should Know To Succeed In School." The brochures describe ability grouping and tracking, who makes, and how the decisions are made, some implications of the decisions on a student's future, proposed courses of action, and possible outside resources to assist students and parents acquire information and make informed decisions on courses and tracks. These materials may be acquired by writing to:

Director, Education and Career Development
National Urban League
500 East 62nd Street
New York, NY 10021

Middle Grade Students' Attitudes About Mathematics:

Data from the "On the Right Track" Study

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Paper prepared for the symposium, "On the Right Track:
The Consequences of Mathematics Course Placement
Policies and Practices in the Middle Grades"
Chicago, IL: April 5, 1991

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Introduction

"On the Right Track" was a joint project of Educational Testing Service and the National Urban League, funded by the Edna McConnell Clark Foundation. The project's purpose was to investigate how grouping is used in middle school mathematics and how it affects the educational experiences of disadvantaged youth. The project was carried out in six urban school districts. In each district, interviews were held with central office staff; with principals and guidance counselors in two to three selected schools; with the math teachers in these schools; and with the principal, guidance counselor, or mathematics department head in a high school that receives a large number of students from each middle school. Math classes in the selected schools were observed twice and students completed a questionnaire about their attitudes toward math, about learning, and about themselves. See Appendix A for the questionnaire item rationale and sources. The questionnaire is attached as Appendix B.

This paper presents responses to the student questionnaire and describes significant differences among the students on the basis of ability group, racial/ethnic group, and gender. Only variables with a statistically significant chi square ($p < .05$) are discussed. The questionnaire was administered to nearly 2,000 students. Useable responses were received from 1,962 students distributed by grade level as follows: 18 percent in grade 6, 34 percent in grade 7, 38 percent in grade 8, 7 percent in grade 9, and 4 percent in ungraded or unknown grade levels. Forty-five percent of the respondents were female and about three-quarters of the students were from minority groups (see Figure 1).

Figure 1: Race/Ethnicity

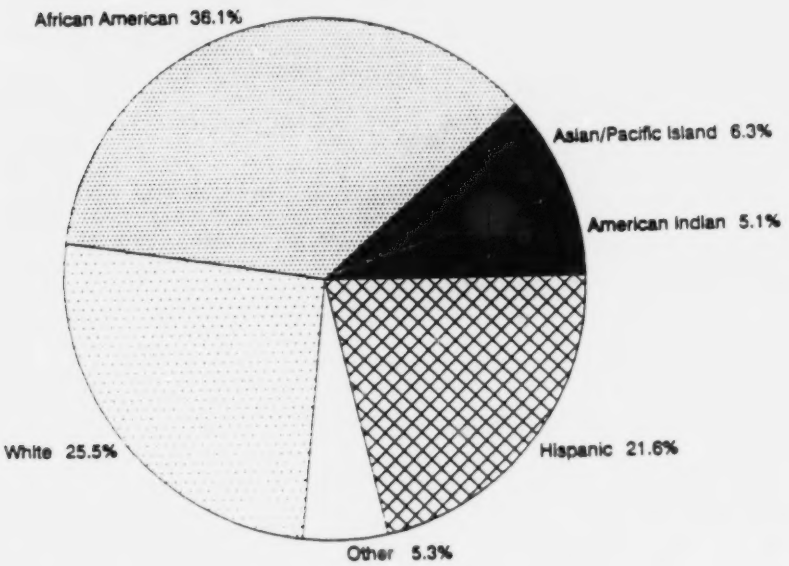
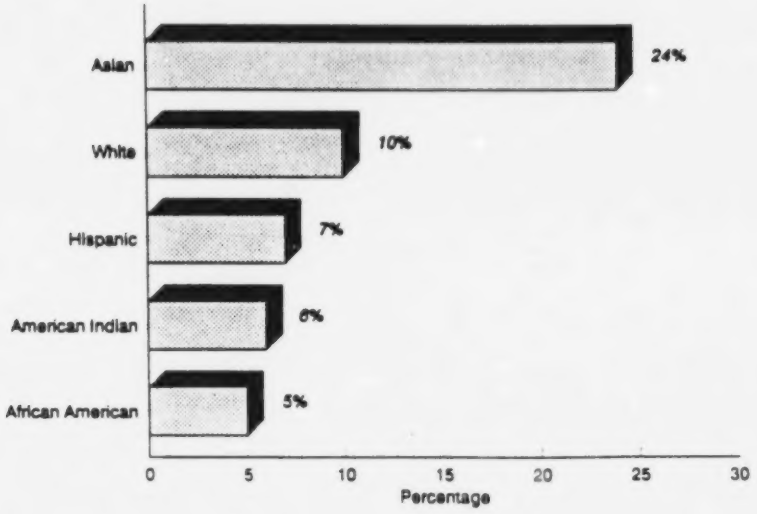


Figure 2: Percentage of Students Indicating That They Chose Their Math Class



Math Grouping

Class Assignment. Ninety-two percent of the students indicated that they were assigned to their math class; 8 percent reported choosing it. There were significant differences, however, for racial/ethnic and ability groups. Asian students were much more likely to have chosen their class than other students, as can be seen in Figure 2. Twenty-four percent of Asian students chose their class compared to 6 percent of American Indians, 5 percent of African Americans, 10 percent of Whites, and 7 percent of Hispanics.

Students in the low ability group were more likely to have been assigned to their class (95 percent) than students in the high and middle groups (90 percent). Virtually all of the heterogeneously grouped students reported being assigned to their classes.

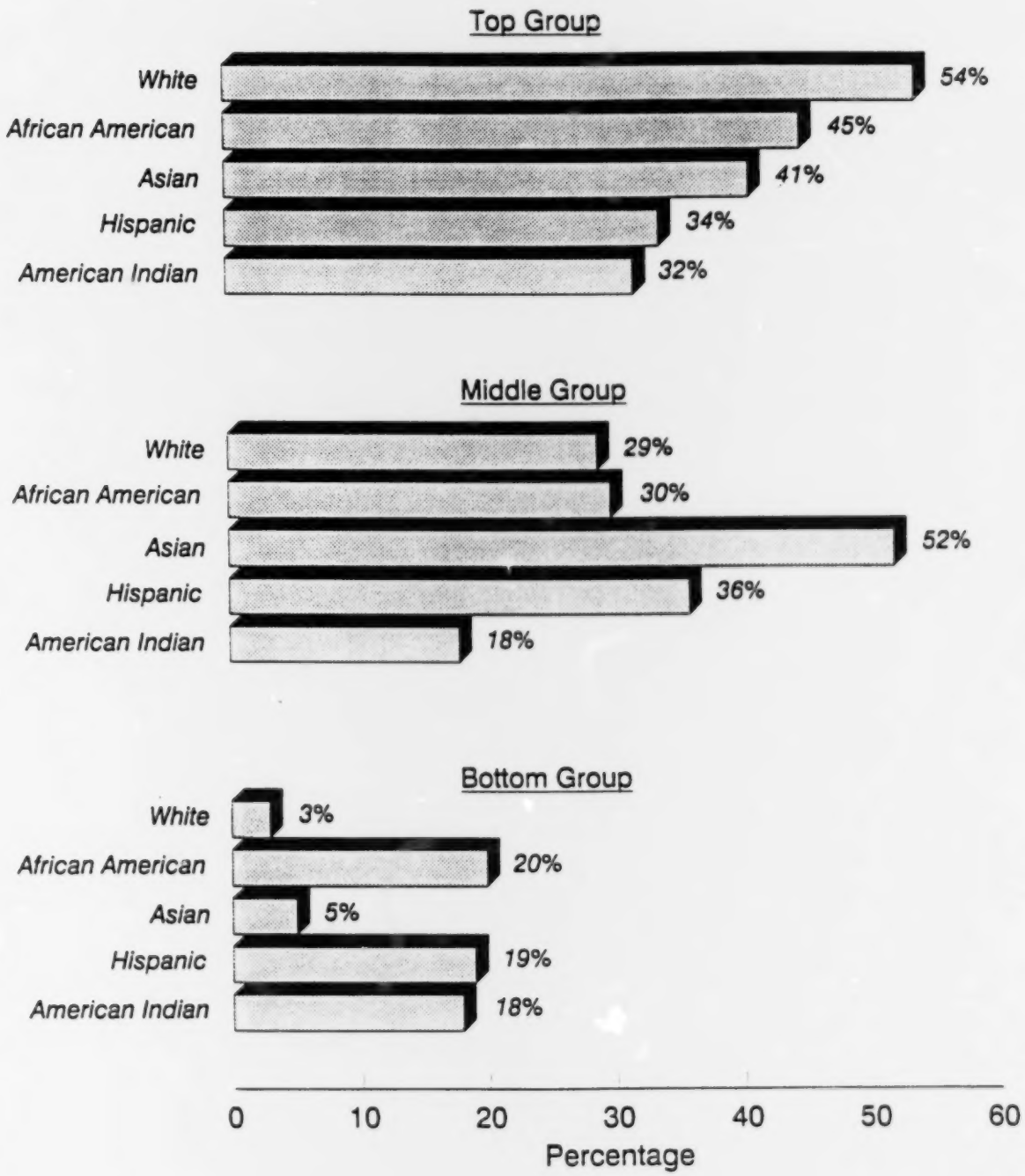
Students who reported that they chose their math class were asked to identify the people they talked to in deciding what math class to choose. The most frequently cited person was a mother (70 percent of the students responding), followed by teacher(s) (58 percent), father (51 percent), a friend (43 percent), and lastly, a guidance counselor (36 percent).

Ability Groups. Personnel at each school were asked to indicate the ability group for each of the math classes. According to this source of information, 42 percent of the students responding to the questionnaire were in a "high" group, 32 percent in a "middle" group, 15 percent in a "low" group, and 10 percent were in a non-grouped, or heterogeneous, classes[1].

Some differences were observed by race/ethnicity, as can be seen in Figure 3. Fifty-four percent of the White students were in the classes

[1]All of the heterogeneous classes were in one school district where policy was that students be heterogeneously grouped for all classes.

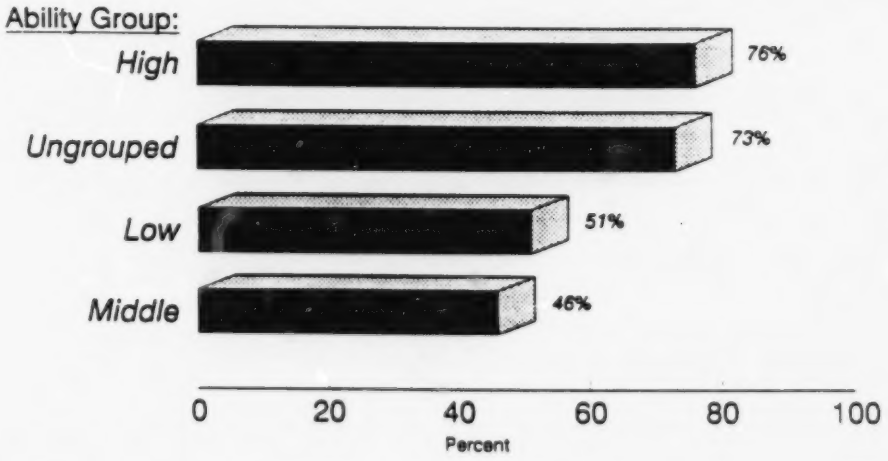
Figure 3: Ability Group Assignment by Race/Ethnicity



designated as high ability groups, compared to about one-third of the American Indian and Hispanic students and 45 percent of the African American students. Only 3 percent of the White students were in classes designated as low groups, compared to about a fifth of the American .ndian, African American, and Hispanic students. More than half of the Asian students were in the "middle" groups.

Students were also asked what math group they were in. Figure 4 shows the percent of students correctly identifying their group. Students in a high or heterogeneous group were much more likely than students in the other groups to correctly identify their ability group.

Figure 4: Percentage of Students Correctly Identifying Their Ability Group



Attitudes and Achievement Expectations

Students were asked a series of questions to assess whether or not they like math; whether they perceive themselves to be good at math, both in the abstract and in comparison with others; and how they see the role of math in their futures. As is shown in Figure 5, the students' attitudes and achievement expectations regarding math appear to be overwhelmingly positive.

How much do you like math? More than a third reported that they like math very much and only 16 percent said they dislike math. There were significant differences however among ability groups. Students in the high group were more likely to like math very much (41 percent) than students in the low group (28 percent), middle group (34 percent), and heterogeneous group (36 percent). Students in the low group (8 percent) were more likely than students in the other groups (about 5 percent) to dislike math very much (see Table 1).

Table 1: "How Much Do You Like Math," by Ability Group

	Low	Middle	High	Ungrouped
Like Very Much	28%	34%	41%	36%
Like Somewhat	55	48	45	51
Dislike Somewhat	10	14	9	9
Dislike Very Much	8	5	5	5

How good at math are you? More than three-quarters of the students responded that they are good or very good at math and only 20 percent said they are not good at all (see Figure 5). There were differences for ability groups, racial/ethnic groups, and males and females (see Tables 2 and 3).

Students in the high ability groups were the most likely to say they were very good at math -- 27 percent of the high group, compared to 10 percent

Figure 5: Students' Attitudes Toward Mathematics

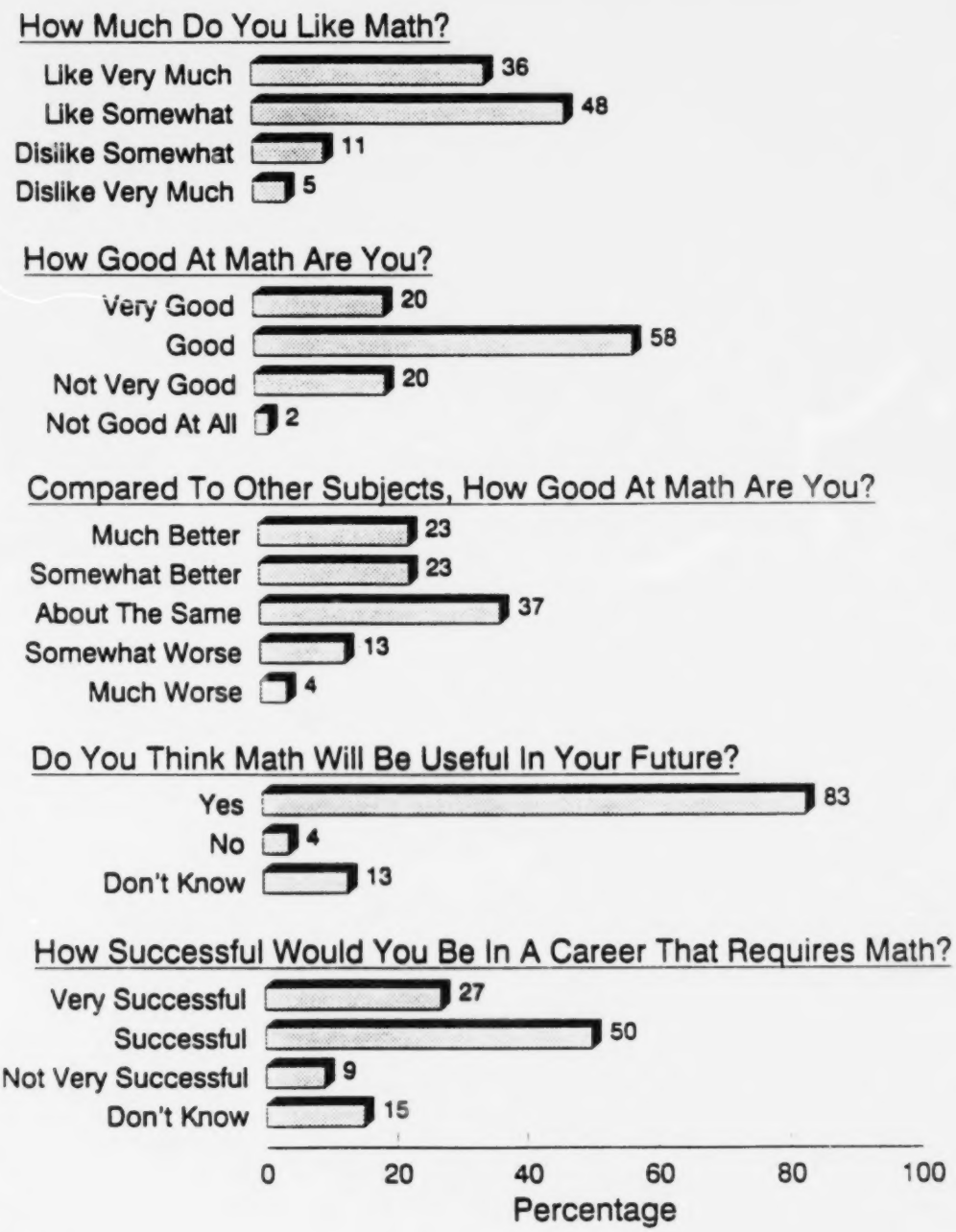

How Much Do You Like Math?
Like Very Much 36
Like Somewhat 48
Dislike Somewhat 11
Dislike Very Much 5
How Good At Math Are You?
Very Good 20
Good 58
Not Very Good 20
Not Good At All 2
Compared To Other Subjects, How Good At Math Are You?
Much Better 23
Somewhat Better 23
About The Same 37
Somewhat Worse 13
Much Worse 4
Do You Think Math Will Be Useful In Your Future?
Yes 83
No 4
Don't Know 13
How Successful Would You Be In A Career That Requires Math?
Very Successful 27
Successful 50
Not Very Successful 9
Don't Know 15
0 20 40 60 80 100
Percentage

Table 2: "How Good at Math Are You," by Ability Group and Sex

	Low	Middle	High	Ungrouped		Male	Female
Very Good	10%	17%	27%	16%		23%	19%
Good	54	59	60	52		59	57
Not Very Good	35	23	12	25		16	22
Not Good at All	1	1	1	7		2	2

Table 3: "How Good at Math Are You," by Race/Ethnicity

	American Indian	Asian	African American	White	Hispanic
Very Good	13%	21%	22%	23%	16%
Good	67	68	56	60	54
Not Very Good	19	11	20	16	27
Not Good at All	1	0	2	1	4

in the low group, and about 16 percent in the middle group and heterogeneous group. Students in the low group were the most likely to say they were not very good at math (35 percent, compared to 23 percent in the middle group, 12 percent in the high group, and 25 percent in the heterogeneous group). Students in heterogeneous classes were the most likely to say they are not good at all in math -- 7 percent, compared to about 1 percent of all others.

Asian students were the most likely to say they were good or very good at math (89 percent; compared to 83 percent of the White, 80 percent of the American Indian, 79 percent of the African American, and 70 percent of the Hispanic students). Males were more likely to be confident that females. Eighty-two percent of the males, compared to 76 percent of the females say they are good or very good at math. In contrast, 22 percent of the females, compared to only 16 percent of the males, said they are not very good at math.

Compared to other school subjects, how good are you at math? As is also shown in Figure 5, more than eight out of ten students said their math ability is about the same or better than it is in other subjects; 46 percent said their math ability is much or somewhat better. There were differences by ability group, racial/ethnic group, and sex (see Tables 4 and 5).

Table 4: "How Is Your Math Ability Compared to Other Subjects," by Ability Group and Sex

	Low	Middle	High	Ungrouped		Male	Female
Much Better	18%	22%	25%	23%		26%	21%
Somewhat Better	24	23	23	24		26	21
About the Same	38	37	38	35		35	40
Somewhat Worse	13	13	12	12		10	14
Much Worse	8	4	2	6		4	4

Table 5: "How Is Your Math Ability Compared to Other Subjects," by Race/Ethnicity

	American Indian	Asian	African American	White	Hispanic
Much Better	32%	22%	23%	19%	24%
Somewhat Better	20	30	21	22	24
About the Same	37	40	39	43	33
Somewhat Worse	7	8	13	14	13
Much Worse	4	0	4	3	6

Among ability groups, 25 percent of the high group said they were much better in math, compared to 18 percent of the low group. Eight percent of the low group and 6 percent of the heterogeneous group said they were much worse in math, compared to 4 percent of the middle group and only 2 percent of the high group. Males estimated their math ability higher than females. Fifty-two percent of the males, compared to 42 percent of the females said that their

math ability was somewhat or much better compared to other subjects. Among racial/ethnic groups, American Indian and Asian students (52 percent) rated their math ability (relative to their other subjects) higher than Whites (40 percent), African Americans (44 percent), and Hispanics (48 percent).

Do you think math will be useful in your future? More than eight of ten students in the study thought that math will be important in their future (see Figure 5). There were differences, however, by race/ethnicity and sex (see Table 6). Asian students were the most likely to think that math will be useful (92 percent), compared to 80 percent of White and Hispanic students, 86 percent of African American students, and 88 percent of American Indian students. Hispanic and White students were the most likely groups to say they didn't know (17 and 15 percent, respectfully). Males were more likely than females to think math will be useful -- 86 percent compared to 80 percent. In addition, females were more likely to say that they did not know whether math would be useful (15 percent compared to 11 percent).

Table 6: "Do You Think Math Will Be Useful in Your Future?" by Race/Ethnicity and Sex

	American Indian	Asian	African American	White	Hispanic		Male	Female
Yes	88%	92%	86%	80%	80%		86%	80%
No	3	0	4	3	3		3	4
Don't Know	8	8	11	17	17		11	15

How successful do you think you would be in a career requiring math? More than three-quarters of the students responded that they would be

successful in a career requiring math (see Figure 5). Among racial/ethnic groups, Hispanic students showed the least confidence (Table 7). Only 71 percent of the Hispanic students said they would be successful in a career requiring math compared to 75 percent of American Indians, 78 percent of Asians, 81 percent of African Americans, and 77 percent of Whites. Confidence was also related to ability groups (Table 8). Thirty-four percent of the high ability group said they would be very successful, compared to only 19 percent of the heterogeneous group and 22 percent of the low and middle groups. Students in the heterogeneous classes and in the low groups were also more likely not to know if they'd be successful (23 and 21 percent, respectively, compared to 17 percent of the middle and 9 percent of the high groups). While only 7 and 8 percent of the high and middle groups, respectively, said they would not be very successful, 13 to 14 percent of the low and heterogeneous groups said so.

Attitudes about Math Class

Students were asked two questions regarding the difficulty of their math classes and their level of interest in the class. About two-thirds of the students indicated that their math class was "just right" when asked, "How difficult is this math class for you?" Sixteen percent of the students said the class was difficult for them; 19 percent said it was too easy. There were differences for racial/ethnic groups, males and females, and ability groups. As shown in Table 9, Asian students were the most comfortable with their classes -- 76 percent said the class was just right, 17 percent said the class was easy, and just seven percent said the class was difficult. American

Table 7: How Successful Do You Think You Would Be in a Career That Requires Math?" by Race/Ethnicity

	American Indian	Asian	African American	White	Hispanic
Very Successful	21%	26%	33%	24%	24%
Successful	54	52	49	53	47
Not Very Successful	11	7	7	8	13
Don't Know	15	15	12	15	17

Table 8: How Successful Do You Think You Would Be in a Career That Requires Math?" by Ability Group

	Low	Middle	High	Ungrouped
Very Successful	22%	23%	34%	19%
Successful	43	53	51	45
Not Very Successful	13	8	7	14
Don't Know	21	17	9	23

Table 9: "How Difficult Is this Math Class for You?" by Race/Ethnicity and Sex

	Amer. Indian	Asian	African American	White	Hispanic		Male	Female
Difficult	15%	7%	13%	16%	20%		14	17
Just Right	55	76	69	63	63		65	66
Easy	30	17	18	20	18		22	17

Indian students were the most likely to say the math class was too easy (30 percent); Hispanic students the most likely to say the class was difficult (20 percent). While equivalent proportions of both sexes said their math class was "just right," females were more likely than males to say the class was difficult -- 17 percent of the females compared to 14 percent of the males. Twenty-two percent of the males, compared to 17 percent of the females said the class was easy (see Table 9).

As shown in Figure 6, there were also differences among ability groups. Students in heterogeneous classes were the most likely to say the class was too difficult (20 percent, compared to between 14 and 16 percent of the other groups); the least likely to say the class was just right (56 percent, compared to between 64 and 68 percent of the other groups); and most likely to say the class was easy (24 percent, compared to between 16 and 21 percent of the others).

In response to the second question (How interesting is this math class to you?), three-quarters of the students said that their math class was interesting -- about 30 percent said it was very interesting and 45 percent said it was sort of interesting (see Figure 7). Sixteen percent said math class was sort of boring and only one of ten said it was boring. There were differences among ability groups. Students in the high ability and heterogeneous classes were more likely to rate their math classes as interesting. Thirty-five and 32 percent of the high ability and heterogeneous classes, respectively, rated math class as very interesting, compared with 26 percent of the middle group and 22 percent of the low group. About 37 percent of the low and middle groups rated the class as boring, compared with 23 percent of the high ability and heterogeneous classes.

- Figure 6: Students' Assessment of Math Class Difficulty, by Group

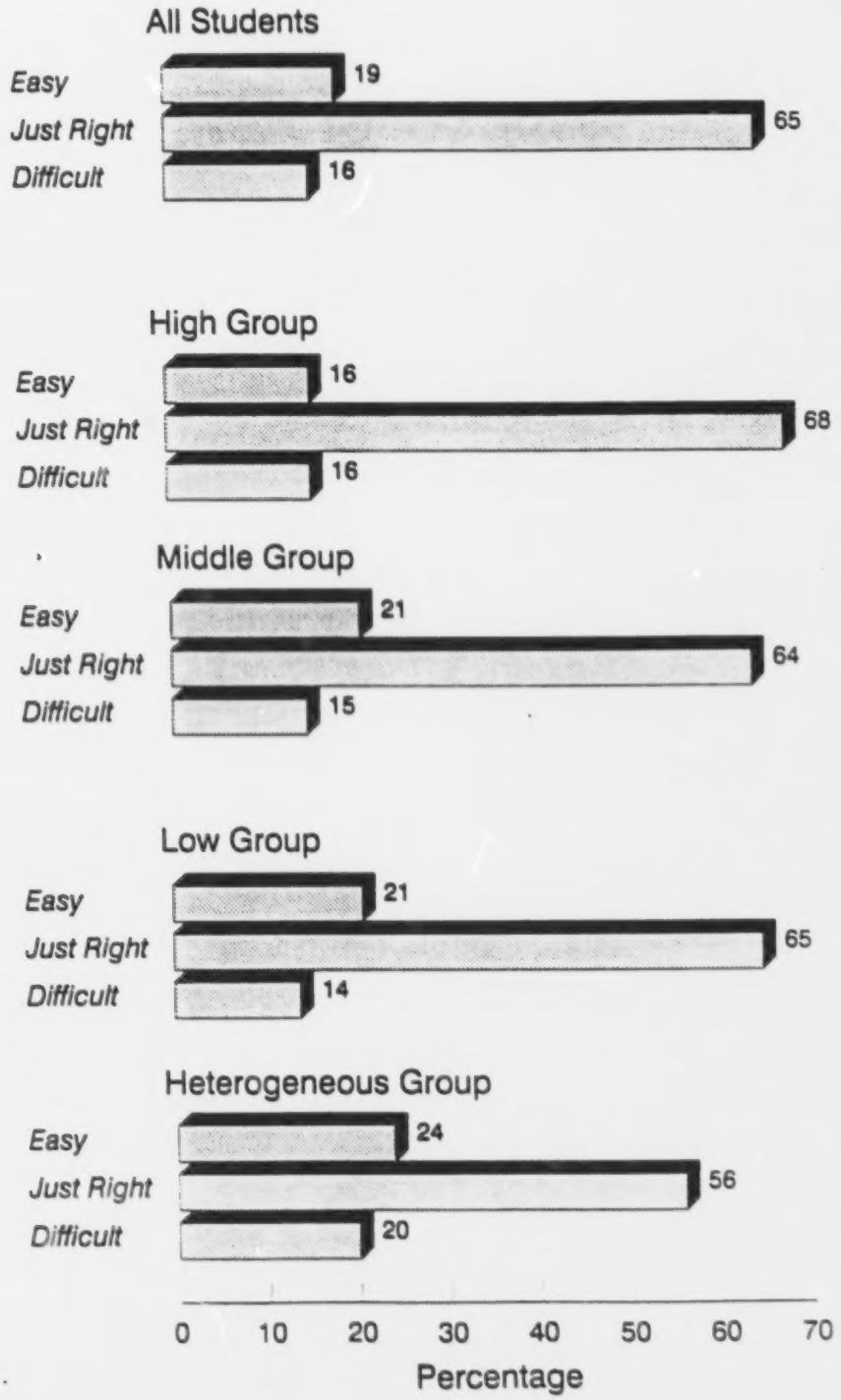
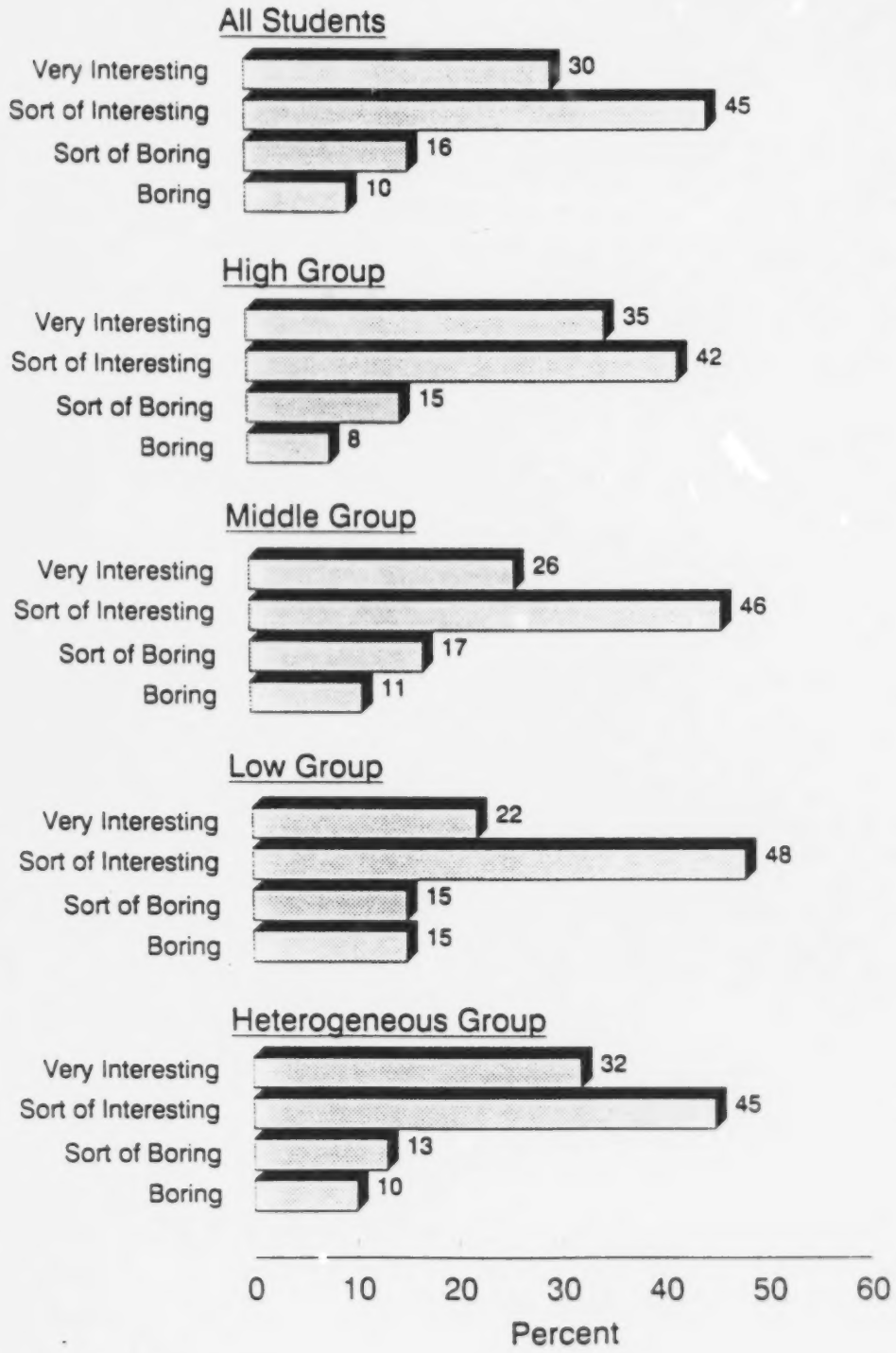


Figure 7: Student Attitudes About Math Class, by Ability Group
(How Interesting Is this Class to You?)



Classroom Interaction

Students were asked to indicate whether they agree or disagree with several statements about what goes on in the classroom. These statements assess the clarity of teacher messages, task orientation, student-peer relationships, and student involvement. Table 10 shows these data and Figure 8 shows the percent of students agreeing or strongly agreeing with each statement.

Clarity of teacher messages. These data show that most students are getting the teachers' messages. More than eight in ten understood what the class is about, knew what had to get done in class, and knew why the things they learned in class were important. There were differences by racial/ethnic group, ability group, and sex (see Tables 11 and 12). American Indian students were more likely than other students to strongly disagree that they usually understood what the class was about (6 percent, compared to between 2 and 3 percent of the other students). Among ability groups, students in the high ability groups were most likely to agree strongly that they usually understood what class was about (32 percent, compared to about 28 percent of the heterogeneous and middle groups, and only 22 percent of the low group). Students in the low and heterogeneous classes were the most likely to disagree or disagree strongly that they usually understood what the class was about (14 and 13 percent, respectively, compared to about 10 percent of the middle and high groups).

Students in the high groups were most likely to disagree or disagree strongly that they knew why things done in class were important -- 18 percent, compared to 14 percent of the middle and 8 percent of the low and

Table 10: Student Classroom Attitudes

	Agree Strongly (Percent)	*Agree* (Percent)	*Disagree* (Percent)	*Disagree Strongly* (Percent)
I usually understand what class is about	29.2	59.6	8.8	2.3
We know exactly what we have to get done in this class	40.2	47.2	11.0	1.6
I know why the things we learn in class are important	43.4	42.7	9.8	4.1
I seldom ask questions in class	17.2	40.2	29.2	13.5
Math class is usually fun	18.6	37.7	22.9	18.1
I usually look forward to math class	16.8	35.8	26.4	21.0
Some groups of students refuse to mix with rest of class	18.1	29.1	30.7	22.0
Students in this class fight with each other	9.8	18.3	30.9	41.0
I like my classmates	33.9	54.1	8.3	3.7
There is a lot of competition in this class	22.4	35.1	29.7	12.9
I don't care about what goes on in this class	5.5	8.8	36.6	49.1
I usually do my homework for this class	45.2	40.0	9.9	4.8
I feel left out of classroom activities	4.1	6.3	32.4	57.2

Figure 8: Student Classroom Attitudes
(Percent Agreeing or Agreeing Strongly with each Statement)

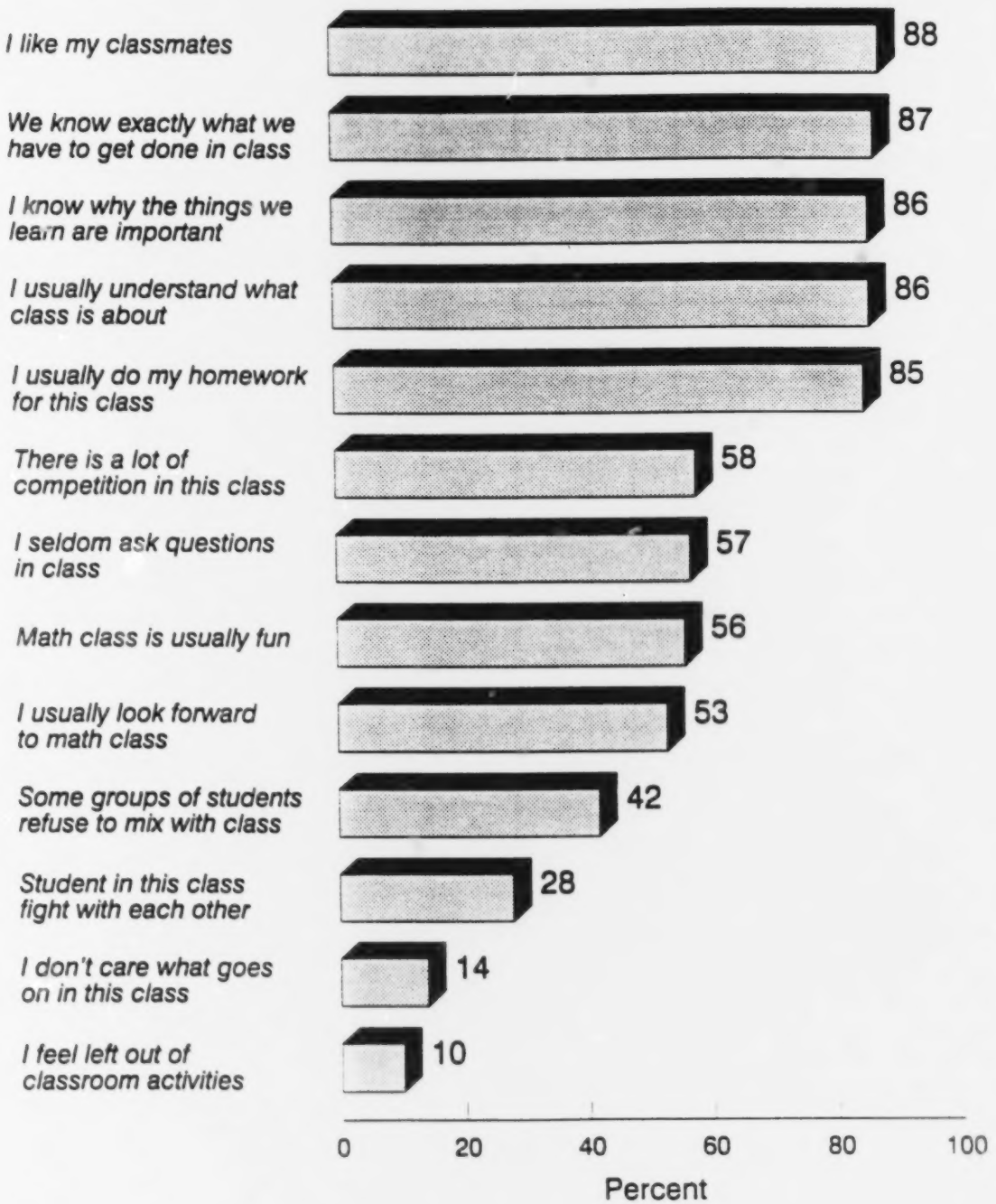


Table 11: "I Usually Understand What the Class is About,"
By Racial/Ethnic and Ability Group

	American Indian	Asian	Black	White	Hispanic		Low	Middle	High	Ungrouped
Disagree Strongly	6%	0%	2%	2%	3%		3%	2%	2%	5%
Disagree	6	12	9	7	11		11	9	9	8
Agree	61	53	58	59	63		64	61	57	59
Agree Strongly	26	35	31	32	24		22	29	32	28

Table 12: I Know Why the Things We Learn in this Class Are Important

	Low	Middle	High	Ungrouped		Male	Female
Disagree Strongly	4%	3%	5%	3%		3%	5%
Disagree	4	10	13	5		8	11
Agree	43	45	41	42		45	40
Agree Strongly	49	42	41	50		44	44

heterogeneous classes. Females (16 percent) were more likely than males (11 percent) not to know why things done in class were important.

Task orientation. Students were only moderately oriented toward math class. A little more than half of the students reported that they seldom asked questions in class, indicated that math class was usually fun, and said that they usually looked forward to math class. Among ability groups, students in the heterogeneous classes were the most likely to report that class is usually fun: 30 percent agreed strongly, compared to less than 20 percent of the other groups (see Table 13).

Table 13: "Math Class is Usually Fun," by Ability Group

	Low	Middle	High	Ungrouped
Disagree Strongly	21%	18%	18%	19%
Disagree	23	25	24	18
Agree	38	40	40	34
Agree Strongly	18	17	18	30

Student peer relationships. The data on peer relationships were mixed, and there were differences (for certain items) among student grouping categories (see Tables 14, 15, 16, and 17). While about half of the students agreed that some groups of students refused to mix with the rest of the class and indicated that there was a lot of competition in class, only about a quarter of the students agreed that students in class fought with each other and almost 90 percent agreed that they liked their classmates. Among racial/ethnic groups, American Indian students were the most likely to say that students fight with each other in class (36 percent); and Asian American students were the least likely (14 percent). While still a high percentage,

Table 14: "Some Groups of Students Refuse to Mix with the Rest of the Class," by Ability Group

	Low	Middle	High	Ungrouped
Disagree Strongly	15%	21%	25%	23%
Disagree	31	30	33	23
Agree	35	29	26	34
Agree Strongly	19	20	16	20

Table 15: "The Students in this Class Fight with Each Other," by Racial/Ethnic and Ability Group

	American Indian	Asian	African American	White	Hispanic		Low	Middle	High	Ungrouped
Disagree Strongly	33%	47%	45%	39%	40%		32%	36%	53%	21%
Disagree	32	39	28	33	30		33	34	29	25
Agree	19	9	17	22	19		24	20	13	30
Agree Strongly	17	5	10	7	11		12	10	5	24

Table 16: "I Like My Classmates," by Racial/Ethnic Group

	American Indian	Asian	African American	White	Hispanic
Disagree Strongly	5%	1%	5%	2%	4%
Disagree	11	9	7	7	8
Agree	58	59	55	55	53
Agree Strongly	26	32	33	36	36

Table 17: "There Is a Lot of Competition in this Class," by Ability Group and Sex

	Low	Middle	High	Ungrouped		Male	Female
Disagree Strongly	16%	14%	11%	14%		12%	14%
Disagree	32	33	30	19		27	32
Agree	33	36	35	37		37	34
Agree Strongly	20	18	25	30		25	20

American Indian students were the least likely group to say they like their classmates (84 percent).

Males felt that there was more competition in class than did females -- 62 percent of the males agreed that there was a lot of competition in class, compared to 54 percent of the females. Students in the low and heterogenous groups were most likely to agree or strongly agree that some groups refused to mix (54 percent, compared to 49 percent of the middle and 42 percent of the high groups). Only 18 percent of the high group agreed or strongly agreed that students fight with each other, compared to 54 percent of students in the heterogeneous classes, 36 percent of the low group, and 30 percent of the middle group. Thirty percent of the heterogeneous group and 25 percent of the high group agreed strongly that there was a lot of competition in class, compared to about a fifth of the others. Sixty and 68 percent of the heterogeneous and high groups, respectively, agreed or agreed strongly that there was a lot of competition in class, compared with 52 percent of the low and 54 percent of the middle groups.

Student involvement. Students appeared to be actively involved in their math classes. Nearly nine in ten students said that they care about what goes on in class, usually do the homework assigned, and don't feel left out of classroom activities. There were differences, however, among student groupings (see Tables 18, 19, and 20). Asian and White students (91 percent) were more likely to say they usually do their homework than the other racial/ethnic groups (between 82 and 84 percent). In addition, American Indian and Hispanic students were much more likely to feel left out of class activities. Sixteen and 14 percent of the American Indian and Hispanic

Table 18: "I Don't Care What Goes on in this Class," by Ability Group

	Low	Middle	High	Ungrouped
Disagree Strongly	37%	44%	57%	51%
Disagree	41	41	32	35
Agree	13	9	7	7
Agree Strongly	9	6	4	7

Table 19: "I Usually Do My Homework for this Class," by Racial/Ethnic Group, Ability Group, and Sex

	Amer. Ind.	Asian	African American	White	Hispanic	Low	Middle	High	Ungrouped	Male	Female
Disagree Strongly	7%	0%	5%	3%	6%	9%	5%	3%	7%	6%	4%
Disagree	11	9	12	6	10	15	11	8	8	11	9
Agree	38	33	41	38	43	49	44	35	37	41	38
Agree Strongly	44	58	42	52	41	28	41	54	48	42	49

Table 20: "I Feel Left Out of Classroom Activities," by Racial/Ethnic and Ability Groups

	American Indian	Asian	African American	White	Hispanic		Low	Middle	High	Ungrouped
Disagree Strongly	48%	56%	62%	61%	53%		52%	57%	60%	57%
Disagree	36	37	29	32	34		33	34	32	28
Agree	10	8	5	5	8		9	6	6	8
Agree Strongly	4	0	4	3	6		6	4	3	7

students, respectively, felt left out, compared to only 8 percent of the other students.

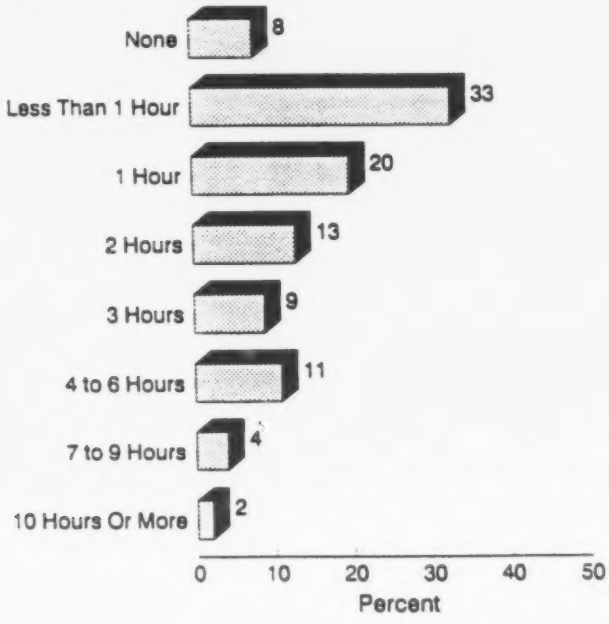
Females were more likely than males to report doing assigned homework. Eighty-seven percent of the females, compared to 83 percent of the males agree or strongly agree that they usually do their homework. Students in the low ability groups were more likely not to care about class -- 23 percent, compared to 11 percent of the high group, 14 percent of the heterogeneous group, and 15 percent of the middle group. Students in the high ability and heterogeneous classes were more likely to do their homework. Fifty-four and 48 percent of the high and heterogeneous groups, respectively, strongly agreed that they usually did their homework, compared to 41 percent of the middle and only 28 percent of the low groups. Twenty-three percent of the low group disagreed or strongly disagreed that they usually do their homework, compared to only 11 percent of the high group and 15 percent of the middle and ungrouped classes. Finally, students in the low group and heterogeneously grouped classes were more likely to feel left out of class activities -- 15 percent agreed or strongly agreed, compared to 9 percent of the middle and high groups.

Study Habits

Homework. Students were asked to indicate the amount of math homework they do (at home and in study hall) and how often they exhibit certain self-regulatory behaviors. As shown in Figure 9:

- o Eight percent of the students did no math homework
- o A third did less than one hour a week
- o A third did between one and two hours a week
- o Nine percent did three hours a week

Figure 9: Amount of Time Spent on Homework per Week



- Ten percent did between four and six hours a week
- Six percent did more than six hours per week.

There were differences among racial/ethnic and ability groups (see Table 21). American Indian students were the least likely group to do much homework -- almost one in five reported doing none and only 12 percent report doing four hours or more per week. Thirty percent of the Asian students reported doing four hours or more of homework per week, compared to 20 percent of the White, 16 percent of the Hispanic, 14 percent of the African American, and 12 percent of the American Indian students.

Only 5 percent of the high ability group reported doing no homework, compared to 8 percent of the middle group, 10 percent of the heterogeneous group, and 15 percent of the low group. Students in the high and heterogeneous groups did the most homework. Twenty and 21 percent of the high and heterogeneous groups, respectively, reported doing four or more hours per week, compared to 15 percent of the middle and 9 percent of the low groups.

Table 21: Hours of Math Homework Done per Week (Including Work Done in Study Hall), by Racial/Ethnic and Ability Group

	American Indian	Asian	African American	White	Hispanic		Low	Middle	High	Ungrouped
None	19%	1%	9%	5%	8%		15%	8%	5%	10%
<1	36	30	38	28	32		40	34	28	37
1	16	14	23	17	22		23	22	19	14
2	14	14	10	17	13		11	13	16	8
3	3	12	7	13	9		4	8	12	9
4-6	9	24	7	16	9		6	10	13	11
7-9	2	4	3	4	4		1	3	4	9
10 or more	1	2	3	.4	3		1	1	3	2
Average*	1.4	2.6	1.8	2.2	2.0		1.3	1.5	2.3	2.2

*Average calculated based on the following estimates: .5 hours for less than one hour, 5 hours for 4 to 6 hours, 8 hours for 7 to 9 hours, and 10 hours for 10 or more hours.

Self-regulatory behaviors. Self-regulatory behaviors help us understand both motivation and students' ability to learn on their own. Students who use these behaviors have been shown to have significantly higher achievement test scores than students who do not use these behaviors.[2] Table 22 shows the frequency of student self-regulatory behavior when studying for math class. Asking for help when problems with homework arise was the most common behavior; 71 percent of the students reported asking for help more than half of the time. This was followed by reviewing class notes and the textbook when preparing for a test, and getting away from distractions when doing homework.

Table 22: Self-Regulatory Behaviors

	Almost Always	More Than Half the Time	Less Than Half the Time	Seldom or Never
When doing homework, I try to get away from distractions	33%	27%	21%	19%
If I have a homework problem, I ask someone for help	47	24	16	13
When I finish my homework, I check it to make sure I did it right	20	25	27	28
When preparing for a test, I review class notes and textbook	32	30%	22	17
When preparing for a test, I write down the things I need to know until I can remember them	23	25	24	28

[2]B.J. Zimmerman & M.M. Pons, "Development of a Structured Interview for Assessing Student Use of Self-Regulated Learning Strategies," American Educational Research Journal, 1986, 23, (4), 614-628.

About 60 percent of the students reported these behaviors most of the time. Students were less likely to check over homework and write down things until they remember them.

There were few differences among groups (see Tables 23, 24, 25, 26, and 27). White students were the least likely groups to check over their homework answers (38 percent compared to between 44 and 51 percent of the other students) and were also least likely to memorize before a test (38 percent compared to between 46 and 55 percent of the other students).

Females were more likely than males to practice several of these behaviors. Sixty-three percent of the females, compared to 57 percent of the males, said they usually try to get away from distractions while doing their homework. Thirty-seven percent of the females, compared to only 28 percent of the males, said they try to get away from distractions almost always. Fifty-two percent of the females, compared to 41 percent of the males, said they usually ask for help if they have a problem with their homework. Seventeen percent of the males said they never ask for help, compared to 9 percent of the females. Twenty-three percent of the females check over their homework to make sure they did it right, compared to only 17 percent of the males. One-third of the males say they seldom or never check their homework, compared to one-quarter of the females. Finally, females are more likely to memorize when preparing for a test. Fifty-three percent of the females memorize more than half the time, compared to 42 percent of the males. One-third of the males seldom or never memorize, compared to only 24 percent of the females.

Table 23: "When Doing My Homework, I Try to Get Away from Distractions," by Sex

	Males	Females
Seldom or Never	21%	17%
Less than Half the Time	23	21
More than Half the Time	28	26
Almost Always	28	37

Table 24: "If I Have a Homework Problem, I Ask Someone for Help," by Sex

	Males	Females
Seldom or Never	17%	9%
Less than Half the Time	18	14
More than Half the Time	25	24
Almost Always	41	52

Among ability groups, students in the low group were more likely to check over their answers -- 52 percent of the low group check answers more than half the time, compared to 46 percent of the high group, 43 percent of the heterogeneous group, and 41 percent of the middle group. Thirty-seven percent of the heterogeneous groups reported seldom or never checking, compared to 30 percent of the middle, 28 percent of the high, and 21 percent of the low groups. Students in the high groups were most likely to review notes and texts before a test (36 percent said they almost always review, compared to 33 percent of the ungrouped, 29 percent of the low group, and 27 percent of the middle group). Students in the middle group were most likely to say they never review (19 percent). Students in the low groups were most likely to memorize before a test (56 percent reported this study habit more than half the time, compared to 48 percent of the middle and heterogeneous classes, and 45 percent of the high group. Students in the high group were most likely to say they seldom or never memorize (31 percent).

Table 25: "When I Finish My Homework, I Check it to Make Sure I Did It Right," by Racial/Ethnic Group, Ability Group, and Sex

	Amer. Ind.	Asian	African American	White	Hispanic	Low	Middle	High	Ungrouped	Male	Female
Seldom or Never	32%	23%	26%	32%	29%	21%	30%	28%	37%	34%	25%
Less than Half the Time	17	32	26	30	27	28	29	27	21	26	28
More than Half the Time	27	21	26	24	23	28	23	26	24	24	25
Almost Always	25	24	22	14	21	24	18	20	19	17	23

Table 26: "When Preparing for a Test, I Review My Class Notes and the Textbook," by Ability Group

	Low	Middle	High	Ungrouped
Seldom or Never	15%	19%	15%	17%
Less than Half the Time	23	26	19	19
More than Half the Time	33	28	30	31
Almost Always	29	27	36	33

Table 27: "When Preparing for a Test, I Write Down the Things I Need to Know Until I Can Remember Them," by Racial/Ethnic Group, Ability Group, and Sex

	Am.Ind.	Asian	African American	White	Hispanic	Low	Middle	High	Ungrouped	Male	Female
Seldom or Never	31%	29%	26%	34%	24%	23%	28%	31%	25%	33%	24%
Less than Half the Time	23	23	24	29	22	22	24	24	27	25	24
More than Half the Time	16	29	26	24	26	27	27	24	21	22	27
Almost Always	30	18	24	14	29	29	21	22	27	20	25

Self-Concept

Self-concept is also related to achievement in mathematics. The majority of students in this study exhibited positive self-concept, as measured by two items -- "I feel good about myself," and "I am able to do things as well as most other people."

Ninety-four percent of the students agreed that they felt good about themselves (with 59 percent of them agreeing strongly). There were differences by race and ability group (Table 28). African American students were the most likely to exhibit high self-concept -- 75 percent of the African American students agreed strongly that they felt good about themselves, compared to between 42 and 58 percent of the other racial/ethnic groups. Students in the low ability groups were the most likely to agree strongly that they feel good about themselves (67 percent, compared to 60 percent of the high group, 55 percent of the middle group, and 51 percent of the students in heterogeneous classes). Students in the low and high groups were equally likely to agree or agree strongly that they feel good about themselves (95 percent, compared to 92 percent of the middle and 89 percent of the heterogeneous groups). Students in the heterogeneous classes were the most likely to disagree (11 percent, compared to 5 to 6 percent of the other groups).

Ninety percent of the students agreed that they were able to do things as well as most people (with 41 percent of them agreeing strongly). As shown in Table 29, there were differences by race and ability group. American Indian and Hispanic students were less likely than the other students to report that they were able to do things are well as most (85 and 87 percent, respectively, compared to between 91 and 94 percent of the other students). Students in the high and low groups were the most likely to agree or agree

Table 28: "I Feel Good about Myself," by Racial/Ethnic and Ability Groups

	American Indian	Asian	African American	White	Hispanic		Low	Middle	High	Ungrouped
Disagree Strongly	2%	1%	0.3%	3%	3%		2%	1%	1%	4%
Disagree	5	6	2	7	5		3	6	4	7
Agree	42	46	23	48	35		27	37	35	38
Agree Strongly	51	47	75	42	58		67	55	60	51

Table 29: "I Am Able to Do Things As Well As Most Other People," by Racial/Ethnic and Ability Groups

	American Indian	Asian	African American	White	Hispanic		Low	Middle	High	Ungrouped
Disagree Strongly	4%	2%	2%	2%	4%		2%	3%	1%	4%
Disagree	11	7	4	7	10		6	9	6	11
Agree	43	54	45	52	53		47	54	47	48
Agree Strongly	42	37	49	39	34		45	34	46	37

strongly that they are able to do things as well as most (93 and 92 percent, respectively, compared to 88 percent of the middle and 85 percent of the heterogenous group).

Locus of Control

Students were asked to indicate agreement or disagreement with two items measuring locus of control, or the amount of control a person thinks they have over their life. Locus of control has also been shown to relate to achievement in mathematics. Students with external locus of control rely on outside forces in their lives and feel that they have little control over what happens to them. Students with internal locus believe that they have control over their lives. About 60 percent of the students exhibited external locus of control by agreeing with the statement, "Chance and luck are very important for what happens in life," while only about 30 percent agreed with the statement, "Every time I try to get ahead, something or somebody stops me." Thus, for reasons that cannot be explained here, there was little agreement between the two items selected to measure locus of control.

There were differences by race/ethnicity and ability group (see Table 30). American Indian (69 percent), Hispanic (71 percent), and African American students (65 percent) were more likely to think that chance and luck were important than Asian (55 percent) and White students (46 percent). Students in the high ability group were the least likely to agree that chance and luck were important -- 54 percent of them agreed or strongly agreed, compared to 78 percent of the low group, 63 percent of the middle group, and 60 percent of students in heterogeneous classes.

Table 30: "Chance and Luck Are Very Important for What Happens in My Life," by Racial/Ethnic and Ability Group

	American Indian	Asian	African American	White	Hispanic		Low	Middle	High	Ungrouped
Disagree Strongly	10%	13%	14%	17%	7%		8%	10%	17%	15%
Disagree	21	32	21	37	22		14	28	29	25
Agree	37	36	39	32	44		43	40	35	30
Agree Strongly	32	19	26	14	27		35	22	19	29

Table 31: "Every Time I Try to Get Ahead, Something or Somebody Stops Me," by Race/Ethnicity, Ability Group and Sex

	Amer. Ind.	Asian	African American	White	Hispanic	Low	Middle	High	Ungrouped	Male	Female
Disagree Strongly	30%	27%	31%	31%	27%	21%	26%	34%	28%	26%	32%
Disagree	31	48	41	48	43	35	45	45	34	41	43
Agree	20	19	18	17	21	29	20	15	20	20	18
Agree Strongly	18	5	11	4	10	16	9	6	19	13	7

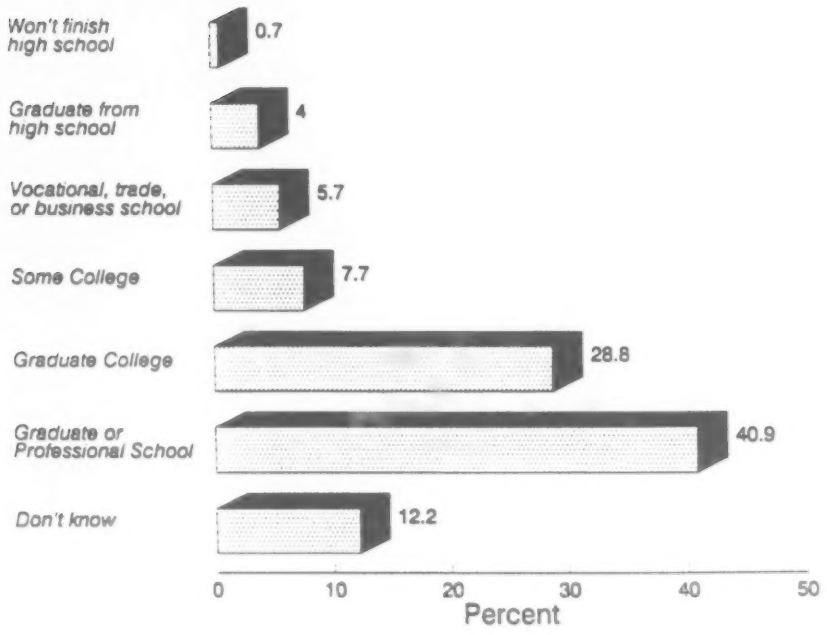
Differences were observed among racial and ability groups and between males and females on the second measure -- "Every time I try to get ahead, something or somebody stops me" (see Table 31). American Indians were the most likely group to agree that someone stops them from getting ahead (39 percent), compared to 31 percent of Hispanics, 28 percent of African Americans, 25 percent of Asians, and 21 percent of Whites). Males were more likely than females to agree that someone always stops them from getting ahead. One-third of the males agreed or strongly agreed, compared to one-fourth of the females. In addition, 13 percent of the males strongly agreed with the statement, compared to only 7 percent of the females. Similarly, students in the high group were the least likely to agree that someone usually stops them from getting ahead -- only 21 percent of the high group agreed or strongly agreed, compared to 45 percent of the low group, 38 percent of the heterogeneous group, and 29 percent of the middle group.

Educational Aspirations

Students were asked to indicate how far they thought they would get in school. Results are shown in Figure 10. Nearly a third of the students predicted that they will graduate from college and four in ten thought they would graduate from college and then attend graduate or professional school. Less than 1 percent planned on dropping out of high school and only 4 percent said they will graduate from high school and not pursue any further education.

While aspirations were high across the board, there were differences by race/ethnicity, ability group, and sex (see Table 32). American Indian (75 percent) and Hispanic students (76 percent) were less likely to say they would graduate from college or go on further to graduate or professional school than African American students (79 percent), White students (83 percent), and Asian students (92 percent).

Figure 10: Educational Aspirations



Females had higher educational aspirations than the males. Eighty-four percent of the females planned to graduate from college or go on to graduate or professional school, compared to 75 percent of the males. Educational aspirations were also related to ability group. Eighty-seven percent of the high group said they would graduate from college and go on to graduate or professional school compared to 77 percent of the middle group, 73 percent of the heterogeneous group, and 64 percent of the low group. Students in the ungrouped grouped classes were most likely not to know how far they'll get in school (20 percent, compared to between 9 and 15 percent of the others).

Table 32: Educational Aspirations by Racial/Ethnic Group, Ability Group, and Sex*

	Amer. Ind.	Asian	African American	White	Hispanic	Low	Middle	High	Ungrouped	Male	Female
< High School	0%	0%	1%	1%	2%	2%	1%	1%	1%	1	1
High School Grad	6	3	3	5	6	10	2	2	10	5	4
Voc/Trade /Bus	4	2	8	5	8	8	7	6	5	8	6
Some College	15	3	9	7	8	16	11	4	10	11	7
College Grad	33	37	29	39	31	31	34	33	32	38	29
Grad/Prof School	42	55	50	44	45	33	43	54	41	37	55

*Cell percentages are calculated based on those students who actually chose an educational level. The following percentages of students responded "Don't Know:" 15 percent of American Indians, 15 percent of Asians, 9 percent of African Americans, 12 percent of Whites, 15 percent of Hispanics; 11 percent of the low group, 15 percent of the middle group, 9 percent of the high group, 20 percent of the heterogeneous group; 15 percent of males and 10 percent of females.

Summary

MATH GROUPING

More than nine out of ten students were assigned to their math group, as opposed to choosing it. Forty-two percent of the students were in the high ability group, 32 percent in the middle group, 15 percent in the low group, and 10 percent in ungrouped or heterogeneous classes.

- o Asian students were more likely to have chosen their math class than students from other racial/ethnic groups.

- o Students in the low group were more likely to have been assigned to their class than students in the high and middle groups.

- o White students were the most likely to be in the high ability group. Nearly a fifth of African American, Hispanic, and American Indian students were in the low group, compared to 3 and 5 percent, respectively, of the White and Asian students. Asian students were the most likely to be in the middle group.

STUDENT ATTITUDES AND ACHIEVEMENT EXPECTATIONS

The majority of students' attitudes toward math and achievement expectations in math were positive. More than three out of four like math, think they are good or very good at math, think they are at least as good at math as their other subjects, think math will be useful in their future, and think they would be successful in a career requiring math.

- o Students in the high ability groups were most likely to like math very much and students in the low group were the most likely to dislike math very much.

- o Students in the high ability groups, Asian students, and males were most likely to say they were good at math. High ability group students, males, and Asian and American Indian students were most likely rate their math ability as much or somewhat better than their ability in other subjects.

- o Asian students and males were more likely than other students to think math will be useful in their future. Hispanic students showed the least confidence that they would be successful in a career requiring math and students in the high ability group were more confident than students in the other groups.

ATTITUDES ABOUT MATH CLASS

Two-thirds of the students said that, in terms of difficulty, their math class was "just right" and three-fourths said their math class was interesting.

- o Asian students were the most likely to think their math class was "just right, American Indian students were most likely to say their math class was "easy," and Hispanic students were most likely to say their class was "difficult." Females were more

likely than males to say their math class was "difficult." Students in ungrouped or heterogeneous classes were the most likely to say the class was "difficult," the least likely to say it was "just right," and the most likely group to say the class was "easy."

- o Students in high ability and heterogeneous groups were more likely than students in middle and low groups to rate their math classes as interesting.

CLASSROOM INTERACTIONS

Clarity of Teacher Messages. More than eight in ten students understand what math class is about, know what has to get done in class, and knows why the things they learn in class are important.

- o American Indian students were more likely not to understand what class is about. Students in the high group were more likely than students in other groups to strongly agree that they usually understand what class is about.

- o High ability group students and females were more likely not to know why things done in class are important.

Task Orientation. Students were only moderately oriented toward math class. Only about half of the students said they seldom asked questions in class, reported that math class was usually fun, and said that they usually looked forward to math class.

- o Students in heterogeneous classes were the most likely to report that math class is usually fun.

Student Peer Relationships. While about half of the students said that some groups of students refused to mix with the rest of the class and indicated that there was a lot of competition in class, only about a quarter said that students in the class fight with each other and nine out of ten reported that they like their classmates.

- o American Indian students were more likely to report that students in class fight with each other and the least likely to report that they like their classmates (although 84 percent of them do).

- o Males were more likely than females to indicate that there is a lot of competition in class.

- o Students in the low and heterogeneous groups were more likely to say that students fight with each other and that some groups of students refuse to mix. Students in the high and heterogeneous groups were more likely to report a lot of competition in class.

Student Involvement. Nearly nine out of ten students said they care what goes on in class, usually do the homework assigned, and don't feel left out of classroom activities.

- o Asian, White, and female students were more likely to report doing their homework and American Indian and Hispanic students were much more likely to feel left out of classroom activities.

- o Students in low ability groups were more likely not to care about class; students in high and heterogeneous groups were more likely to do their homework, and students in the low and heterogeneous groups were more likely to feel left out of classroom activities.

STUDY HABITS

Homework. Eight percent of the students do no homework, a third do less than one hour a week, a third do between one and two hours, and about a quarter do three hours or more.

- o Asian students reported doing the most homework and American Indians the least.

- o Students in the high and heterogeneous groups did the most homework.

Self-Regulatory Behaviors. About 60 percent of the students reported the following behaviors most of the time when studying for math class: asking for help when problems arise, reviewing class notes and the textbook when preparing for a test, and getting away from distractions while doing homework. Students were less likely to check over their homework and write things down until they can remember them.

- o White students were the least likely to check over their homework.

- o Females were more likely than males to try to get away from distractions when doing homework, ask for help if they have a homework problem, check over their homework, and memorize when preparing for a test.

- o Students in the low groups were more likely to check over their answers and to memorize before a test. Students in the high groups were more likely to review their notes and the text before a test and to say they seldom or never memorize.

SELF-CONCEPT

The majority of students (more than 90 percent) reported "feeling good about themselves" and "able to do things as well as most people."

- o African American students and students in the low ability groups were more likely to agree strongly that they felt good about themselves. Students in heterogeneously grouped classes were more likely to disagree or disagree strongly that they feel good about themselves.

- o American Indian and Hispanic students were less likely to report that they were able to do things as well as most people. Students in the high and low groups were more likely to report such confidence.

LOCUS OF CONTROL

About 60 percent of the students exhibited external locus by agreeing that "chance and luck are very important for what happens in life." Only 30 percent, however, agreed that "every time I try to get ahead, something or somebody stops me."

- o American Indian, Hispanic, and African American students were more likely to think that chance and luck are important, and high ability group students were the least likely to agree with that statement.

- o American Indian and male students were more likely to agree that someone usually stops me from getting ahead. Students in high ability groups were least likely to agree with the statement.

EDUCATIONAL ASPIRATIONS

Educational aspirations were high. Nearly a third of the students predicted that they will graduate from college and four in ten thought they would attend graduate or professional school. Less than 1 percent planned on dropping out of high school and only 4 percent said they will not go beyond a high school education.

- o American Indian and Hispanic students were less likely to say they would graduate from college or go on further to graduate or professional school.

- o Females were more likely to plan on graduating from college or going on to graduate or professional school than males.

- o Students in the high ability group were more likely to say they will graduate from college or go on to graduate or professional school. Students in heterogenous classes were more likely not to know how far they'll go in school.

Appendix A

Rationale and Item Sources

The math attitude item (Item 1) assesses the general orientation of the students toward the subject. It is adapted from K.A. Tye, The Junior High School: School in Search of a Mission. Latham, MD: University Press of America, 1985.

The math achievement expectancies items assess students' perceptions of their math ability, both in the abstract and in relation to other subjects. Items 2, 3, and 5 are from D. Reuman, How social comparison mediates the relation between ability-grouping practices and students' achievement expectations in mathematics, Journal of Educational Psychology, 1989, 81 (2), 178-189. Item 4 is adapted from the Grade 8 questionnaire of the National Educational Longitudinal Study (NELS:88) of the US Department of Education.

Item 6 asks the students if they chose or were placed in the math class they are taking; it is adapted from the student questionnaire for High School and Beyond (HS&B) of the US Department of Education; the second part of this item asks students who report choosing their math class if they had assistance from parents, a guidance counselor, a teacher, or a friend. This question is also adapted from HS&B. Analysis of similar HS&B items (R. Ekstrom, A descriptive study of public high school guidance, Report to the Commission on Precollegiate Guidance and Counseling, June 1985; V. Lee and R.Ekstrom, Student access to guidance counseling in high school, American Educational Research Journal, 1987, 24 (2), 287-310.) showed that minority high school students were more likely to be assigned than to choose their curriculum and courses and less likely to receive assistance from a guidance counselor. Inclusion of these items will make it possible to determine if a similar situation exists in the junior high/middle schools in this study.

The item about math ability group (Item 7) assesses the accuracy of students' knowledge of their math course placement. It is adapted from the NELS:88 questionnaire for eighth grade students.

Question 8 assesses whether the content of the math class is appropriate and challenging for the students; question 9 assesses the students' interest in the class. Both are adapted from Tye.

Amount of time spent on homework is indicative of student involvement with the subject. This question and a related question for teachers will help us determine the relative contributions to amount of math homework of teacher expectations and student compliance. Item 10 is adapted from NELS:88.

Self-regulatory behaviors help us understand both motivation and students' ability to learn on their own. Students who use self-regulatory behaviors have been shown to have significantly higher math achievement test scores than students who do not use these behaviors (B. J. Zimmerman & M.M.Ponz, Development of a structured interview for assessing student use of self-regulated learning strategies, American Educational Research Journal, 1986, 23 (4), 614-628). Question 11 assesses five aspects of self-regulatory behavior: a-environmental structuring, b-seeking social assistance, c-self-evaluation, d-reviewing records, and e-rehersing and memorizing. These items have been adapted from Zimmerman and Ponz.

12 a-q is a series of items adapted from Oakes. Items a, b and c assess clarity of teacher messages; items d, e and f assess task orientation; items g,h, i and j assess student-peer relationships; items k,l and m assess student involvement.

The students' perception of the most important thing they have learned in a given class (Item 13) has been used by both Oakes and by Tye. A parallel item for teachers whose classes will be observed will identify the three most important things each teacher hopes the students in a class will learn.

Item 14 assesses educational aspirations. It is taken from NELS:88.

Items 15 a and c assess self-concept; items 15 b and d assess locus of control. Both are taken from NELS:88.

The remaining items are background information about student sex and race/ethnicity (these are adapted from NELS:88) and identifying information about the school and grade. They will be used as bases for analyzing and explaining the findings.

Paper prepared for the Symposium, "On the Right Track:
The Consequences of Mathematics Course Placement,
Policies and Practices in the Middle Grades"
American Educational Research Association
Chicago, IL: April 5, 1991

Life in the Classroom:
The Influence of Class Placement and Student Race/Ethnicity

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Life in the Classroom: The Influence of Class Placement and Student Race/Ethnicity

Ana María Villegas and Susan M. Watts

During the past two decades, increasing empirical attention has been paid to the processes and consequences of tracking students for instruction. School districts have traditionally assigned students to mathematics classes on the basis of perceived ability and/or achievement. This practice, however, has come under sharp criticism of late. Currently, many educators are calling for the elimination of tracks or ability groups. Just this year, the National Education Association and the National Governors Association questioned the efficacy of instructional tracking and challenged school systems to develop alternatives to ability grouping.

While meant to address the academic needs of all students, critics of tracking argue that this practice is detrimental to pupils in the less advanced groups, and has little value for those in the more advanced classes. The critics point to the overwhelming evidence showing that in comparison with high ability students, low ability pupils spend less time on actual instruction (Hilliard, 1989; Irvine, 1989; Lehr & Harris, 1989; Oakes, 1985, 1986; Rosenthal, 1973), engage in less favorable interactions with the teacher (Cazden & Mehan, 1989; Collins, 1986; Good, 1980; Irvine, 1990; Leder, 1987; Moll, 1986; Rist, 1970; Sells, 1981; Taylor, 1979), and receive watered down curricula (Anyon, 1981; Gamoran & Berends, 1987; Metz, 1978; Moll, 1988; Oakes, 1986; Stage, 1989). In light of these findings, it is not surprising to learn that those placed in low ability groups rarely move on to more advanced instructional levels.

Because minority students are overrepresented in the lower academic tiers, they are especially hurt by tracking (Braddock, 1989; Gamoran & Berends, 1987; Hilliard, 1989; Irvine, 1989; Metz, 1978; Moll, 1986; Oakes, 1986; Sells, 1978; Slavin, 1987; Winn & Wilson, 1983). Making matters more difficult is that teachers have been shown to treat minority students less favorably than their white counterparts, even within the same instructional track (Aaron & Powell, 1982; Irvine, 1985; Jackson & Cosca, 1974; Rubovits & Maehr, 1973). Thus, minority students are doubly at risk of engaging in negative interactions with their teachers. This is regrettable because the heart of the schooling experience is the classroom interactions of teacher and students. Ultimately, students' academic success and/or failure is affected by these interactions.

This paper reports data collected as part of the "On the Right Track" study conducted jointly by Educational Testing Service and the National Urban League. Specifically, it addresses three questions:

1. What is the ethnic composition of the different mathematics instructional tracks or groups observed in place in the six urban school districts that participated in the study?

2. What are the similarities and differences between and among the instructional tracks or groups in terms of:

   a. verbal interactions of teacher and students?
   b. types of mathematics being taught?

3. How do teachers interact with white and minority students?

The remainder of this paper consists of three sections. The first describes the methodology used to address the questions listed above. Attention is given to the selection of classes, and to the data collection and analysis procedures. Section two presents and discusses the findings by research question. The last section provides a summary of the major findings.

Methodology

The Sample

A total of 89 classes were selected from six urban school districts to participate in this portion of the study. These classes were chosen in a two step process. First, Central Office administrators from each district were asked to identify two schools that would serve as data collection sites. Second, the principals of these schools were asked to choose two mathematics classes representing low, middle, and high levels of instruction (if present) for each middle and/or junior high school grade taught in their building (i.e., grades 6 through 9). When grouping was not present, the principals were asked to select three math classes for each grade level. In some cases there were only two math classes available for a grade level.

Data Collection Instruments and Procedures

Data were collected from the selected mathematics classes by means of two instruments specifically designed for this study--a structured classroom observation coding form and a classroom observation schedule. The observation coding form was used to collect teacher-pupil interaction data. When conducting structured observations, the data collector codes the behavior of the teacher and students according to a system of pre-established categories. Behavior is sampled systematically (e.g., every 30 seconds). When these codes are analyzed, they yield a picture of the actual teaching-learning process. An advantage of using structured observation is that observers can be trained with relative ease to use these instruments to a high level of reliability.

Over the last two decades or so hundreds of structured classroom observation systems have been developed, but one of the most widely used is the Flanders Interaction Analysis System. The Flanders System was revised to

meet the objectives of this study. (A copy of the revised instrument is included in Appendix A). As revised, the instrument includes two dimensions of teacher talk--function and direction. The seven functions of teacher talk included are:

a. **Informative**: the teacher gives facts or opinions about academic content, or expresses his/her own ideas.

b. **Elicitation**: the teacher elicits information about the academic content of the lesson with the intent of having students respond to the elicitation.

c. **Accepts or uses ideas of students**: the teacher accepts, clarifies, builds on, or develops ideas suggested by students.

d. **Rejects ideas of students**: the teacher rejects a student's response or idea without probing it.

e. **Directive**: the teacher gives directives, commands, or orders with which students are expected to comply.

f. **Praise**: the teacher praises a student's behavior.

g. **Criticize**: statements from the teacher intended to change student behavior.

The direction dimension of teacher talk was added to the instrument to allow for the coding of behavior with reference to the ethnicity and gender of the students with whom it was associated. Provision was made for coding teacher talk according to whether it was directed to individuals from the following groups: white male, white female, African American male, African American female, Hispanic male, Hispanic female, other male, other female. Direction could also be associated with small groups or the whole class.

The revised instrument includes two dimensions of student talk as well--type of talk and characteristics of speaker. The two types of student talk are **response** (talk by student in response to a statement initiated by the teacher), and **initiation** (talk initiated by the student). Also coded was the

ethnicity and gender of the student observed talking (white male, white female, African American male, African American female, Hispanic male, Hispanic female, other male, other female).

An observation schedule was developed to collect classroom data as well. The schedule, which was completed by the observer during each classroom visit, provides information about the designated instructional level of the class (low, middle, high, other) and the ethnic composition of its members. Equally important, the schedule asks the data collector to give an overall description of the instructional event observed. Most relevant for the analyses reported in this paper is the information about the types of mathematics being taught (basic arithmetic processes; fractions, decimals, percentages; algebra; geometry; measurement). A copy of the classroom observation schedule appears in Appendix B.

Six Urban League education specialists and six ETS researchers were trained in the use of the observation instrument and schedule. The training session consisted of nearly one day of presentation and discussion of the coding categories, and practice coding with the use of transcripts and videotape recording of classroom interactions. To assure consistency and validity of the classroom interaction data, the coding of each observer was checked for reliability at the conclusion of the training session. Scott's Pi coefficient was used to measure reliability. The Scott coefficient gives the degree of agreement between two coders. A value of 1.0 indicates perfect agreement and a value of 0.0 indicates no agreement. The reliability check results showed observer-trainer agreements ranging from .78 to 1.00; this is unusually high for observations using structured instruments such as the one developed for this study. One possible explanation for the high level of

agreement is that transcripts of the verbal interaction between teacher and students were used during the reliability check session. The use of transcripts facilitates coding and can yield higher results than normal. Another possible reason for the high results is that coder reliability was calculated between each observer and the trainer, rather than among the observers being trained. This procedure may have resulted in higher than expected coefficient estimates.

Classes were observed twice during the 1989-90 school year, once in the Fall and then again in Spring. Each observation was conducted by a trained observer from either the Urban League or ETS. The observer generally sat on the side or in the back of the room for the full class session which usually lasted 50 minutes. For a period of 30 minutes, the observer coded the classroom behaviors of teacher and students at a 30 second interval. During this time, the observer also completed a classroom observation schedule.

Research Questions and Procedures

Question 1: What is the ethnic composition of the different mathematics instructional tracks or groups? Descriptive information regarding the ethnic composition of the low, middle, and high mathematics groups was obtained from the class enrollment item in the observation schedule completed by the observers for all 89 classes visited in the Fall of 1989. The analysis included comparisons of the percentage distributions for white and minority students (including African American, Hispanic, and others) by group level.

Question 2: How do the verbal interactions of teacher and students, and the types of mathematics being taught compare across instructional tracks or groups? Teacher-pupil interactions were analyzed by calculating percentage distributions for the following variables: (a) amount of teacher and student

talk; (b) amount of student talk by function (responds, initiates); and (c) amount of teacher talk by function (informs, elicits, accepts, rejects, directs, praises, criticizes). The frequency with which different types of mathematics were observed (basic arithmetic; fractions, decimals, percentage; word problems; algebra; geometry; measurement) was tabulated by instructional group. Differences between and among the instructional groups on each of the above listed variables were tested by means of the chi square statistic.

While the research design called for each class to be observed twice, for a variety of reasons (such as absence of the regular teacher) 15 classes were observed only once. These included three low-level, nine middle-level, and three high level classes. These 15 classes were excluded from the classroom interaction analyses. Thus the interaction portion of this report (the portion which addresses research questions 2 and 3) is based on data collected in 74 classrooms.

Question 3: How do teachers interact with white and minority students?

The most complex portion of the analysis centered around the verbal interactions of teachers with white and minority students. This necessitated that an average per pupil measure of interaction be calculated for each coding category by ethnic group. In every case, the per pupil measure was adjusted to accommodate variations in the ethnic composition of the class, the total number of minutes coded, and class size. That is, for each class observed the number of tallies associated with students of each ethnic group was divided by the number of students of that particular ethnic group enrolled in the class. Variations in the total number of minutes coded during each observation were corrected to a standard 30 minutes. Variations in class size were corrected by dividing the actual size of the class observed by the average class size in

the sample. Fall and Spring per pupil measures for each of the 74 classes were averaged to produce a more valid and reliable measure than that which would results by using two separate scores. In addressing this particular research question, the classroom is used as the unit of analysis.

The data for two teacher-talk variables--rejects student's ideas and praises students--could not be analyzed separately because the numbers were too small to carry out tests of statistical significance. Data for teacher praise and criticism were combined to create a composite variable that was labeled focus on student behavior. Thus, eight variables were analyzed:

1. Teacher provides information to the students.
2. Teacher elicits information from the students.
3. Teacher accepts or uses students' ideas.
4. Teacher directs students' behavior.
5. Teacher criticizes students' behavior.
6. All teacher talk focusing on student behavior (praise/criticism).
7. Student responds to statements initiated by the teacher.
8. Student initiates interactions of their own.

Variables 1-6 pertain to teacher talk, while variables 7 and 8 deal with student talk. The teacher-talk variables were grouped into three broad categories: academic (including variables 1-3: informs students, elicits information from students, uses students' ideas); procedural (including variable 4: directives to students); and behavioral (including variables 5 and 6: criticism, and praise/criticism). By grouping the teacher-talk variables in this manner, we gained important insight into the teachers' use of instructional time.

Since the interaction patterns were very similar for African American, Hispanic, and other minority students, the data for these three subgroups were collapsed into a single "minority" category. The eight per pupil measures for white and minority students were compared, and discrepancy scores were calculated. Observed differences between the two groups were tested statistically using paired *t* tests.

Findings

The three research questions listed above provided the organizing structure for this section. First, the instructional groups and their ethnic composition are described. Then, the quality of the interactions between teacher and pupils and the types of mathematics instruction observed in the low, middle, and high groups are compared. Finally, the quality of teacher interactions with white and minority pupils is analyzed.

Instructional Groups and Their Ethnic Composition

As was explained by Ekstrom (1991), five of the six districts participating in the study assigned students to their respective mathematics classes primarily on the basis of perceived ability and/or achievement. These districts are Eastport, Southport, Westport, Northport, and River City. Defending the use of ability grouping, several teachers interviewed explained that the narrower range of ability level within any single class made it easier for them to plan for the needs of their pupils. One district (Lake City), however, had abandoned homogeneous grouping altogether, preferring to assign pupils of varying achievement levels to each math class. This change in placement strategy was prompted by a concern that homogeneous grouping often resulted in ethnically segregated instructional tracks, with minority

students overrepresented in low-level classes and underrepresented in the high-level groups.

The information summarized in Table 1 yields insight into the type and extent of academic differentiation present in the sample of classes selected by school personnel. Of the 89 classes, 10 were heterogeneously grouped. All 10 of these classes were from Lake City. The remaining 79 classes included 17 that were designated as low ability, 32 designated as middle or average ability, and 30 designated as high ability. It is important to note that administrators and teachers rarely referred to the classes in their schools as "low," "middle," and "high." This terminology comes from our own research design. As was explained previously, the principals from the participating schools were asked to select classes that represented these three levels of instruction (if present in the school). While these labels were not commonly used in the schools, the staff nonetheless made clear distinctions between the "basic," "regular," and "advanced" classes (or equivalent designations), thereby signalling the existence of an academic hierarchy. Thus, while cautious not to use traditional tracking labels, all but one of the districts participating in the study continue to sort students for mathematics instruction on the basis of perceived ability.

Table 1

Distribution of classes in the sample selected by school personnel by group assignment

Homogeneous grouping			Heterogeneous grouping	(Total)
Low	Middle	High		
17	32	30	10	89

While we asked school personnel to select classes in each grade representing low, middle, and high levels of instruction, the sample included many more middle- and high-level classes. This "tilt" toward the higher level classes could be the result of the types of schools selected by the districts to serve as data collection sites, since two magnet schools enrolling high achieving students were included in the study. However, our interview data suggests a different interpretation. Many central office administrators, school principals, and classroom teachers were deeply concerned about the possible negative impact of ability grouping. This concern may have translated into efforts to reduce or eliminate the lowest academic track while maintaining the distinctions between average and above average students. Such action is not surprising given the growing evidence that instructional practices typically associated with low-level groups tend to accentuate any inequalities in skills and knowledge that may be present when pupils are initially assigned to these classes (Cazden & Mehan, 1989; Hilliard, 1989; Irvine, 1989; Lehr & Harris, 1989; Oakes, 1985; Rist, 1970). There is evidence to suggest that low ability classes are disappearing nation-wide. In a recent survey (NELS 88), 31% of eighth graders said they were in a high ability group for math, 42% said they were in a middle ability group, and only 7% said they were in a low ability group. (15% said they were not grouped; 5% did not know whether or not they were grouped.) Thus our data are not atypical.

The research literature provides evidence that minority students are overrepresented in low ability tracks (Braddock, 1989; Gamoran & Berends, 1987; Hilliard, 1989; Irvine, 1989; Metz, 1978; Moll, 1986; Oakes, 1986; Sells, 1978; Slavin, 1987; Winn & Wilson, 1983). This led us to examine the

ethnic composition of the low, middle, and high instructional groups in our sample. As Table 2 shows, of the 1990 students in the tracked classes, 612 were white and 1378 were minority. That is, nearly 70 percent of the students in these classes were of minority background. The large percentage of minority students in our sample parallels current statistics in many urban school districts.

Table 2 also shows the percentage distribution of white and minority students by group level. From the table it is clear that in comparison to their white peers, minority students were overrepresented in the low-level classes and underrepresented in the high-level group. A slim eight percent of the white student sample was enrolled in classes designated as low ability compared to 23 percent of the minority sample. Conversely, 56 percent of the white students were in the high ability group compared to only 36 percent of their minority peers. Middle level classes were more equally balanced, including 36 percent of the white students and 41 percent of the minority pupils.

Table 2

Percentage distribution of white and minority students in the original sample by instructional level

Designated instructional level	Race/ethnicity white (612)	minority (1,378)	Total (1,990)
Low-level classes	8.0	23.0	17.0
Middle-level classes	36.0	41.0	40.0
High-level classes	56.0	36.0	43.0

The overrepresentation of minority students in the low-level mathematics classes is in part a consequence of earlier schooling that failed to prepare the pupils adequately. Adding to the problem, however, were certain procedures used in these districts to assign students to mathematics instruction. For example, requiring language minority pupils to be excellent in English as well as in mathematics in order to be placed in a "high ability" math class seems inappropriate for this group of students.

Another questionable practice observed in these districts was that of heavy reliance on standardized test results, almost to the exclusion of students' prior classroom performance and teacher recommendations, when making class placements. Because standardized test scores may mask the talents of many minority students, it would seem more appropriate to give greater weight to other information about the pupils' class performance. It should be pointed out that all five districts with grouping had policies calling for the use of teacher recommendation as one criterion for class placement. In practice, however, relatively little attention was given to this criterion, especially for students' initial enrollment in the middle schools. Part of the problem seems to be that recommendations are seen as highly subjective. Because those making initial placement decisions in a junior high/middle school typically have no prior experience with the students and rarely, if ever, know the teachers who give the recommendations, they are reluctant to place much weight on them. Thus, standardized test scores often are the determining factor in class placements. We suspect this practice denies many talented minority students access to the high ability track.

In all fairness to the districts, it should be pointed out that many schools attempt to correct for possible misplacement of students during the

initial weeks of school. Once classes begin, however, it is highly problematic to move students between and among classes. Thus, the structure of the middle and junior high schools themselves, together with the lack of articulation between elementary and middle schools, are obstacles to equitable placement decisions.

In the next two sections, the focus of discussion shifts from a general description of the various instructional tracks and track assignments to the day-to-day experiences of students once placed in particular classes.

Life in the Low, Middle, and High Ability Groups

Research shows that low, middle, and high ability groups constitute different interactional contexts. Generally, students in the low ability groups have little control over their own learning, receive less instructional time, spend more time on routines and in getting organized, and get more criticism and less praise from teachers. In contrast, high achieving students have more control over their learning, receive more instructional time, engage in more demanding academic tasks, and get more praise and less criticisms from teachers (Anyon, 1981; Cazden & Mehan, 1989; Good, 1980; Hilliard, 1989; Irvine, 1990; Oakes, 1985; Rist, 1970; Stage 1989).

The information presented in Tables 3 through 5 provide a picture of life in the low, middle, and high achieving classes in our sample. Examination of Table 3 shows minimal differences across the groups regarding the percentage of teacher and student talk. What is striking about these distributions is the preponderance of teacher talk, which accounts for 86 to 89 percent of all verbal interactions. This suggests that instruction in all group levels was tightly controlled by the teacher, with students assuming the more passive role of listener. This finding is in sharp contrast to current

thinking in education which suggests that teachers need to give students a fair amount of control over their own learning and encourage them to engage in substantive interactions with their peers.

Table 3

Percentage of teacher and pupils talk by group level

Teacher/pupil talk	Designated instructional level		
	Low	Middle	High
Teacher talk	86	89	88
Pupil talk	14	11	12
(Total)	(100)	(100)	(100)

Table 4 provides additional insight into the extent of teacher control over the verbal exchange, by instructional level. The table shows that the overwhelming majority of student talk was in response to statements initiated by the teacher. That is, responses to teachers accounted from 57 to 69 percent of all student talk. Pupils in the high ability group, however, had more opportunities to introduce their own topics within the ongoing instructional conversation. Specifically, 43 percent of the high achievers' talk consisted of initiations, compared to 31 percent for pupils in both low and middle groups. These differences, however, were not statistically significant.

Table 4

Percentage of student talk by function and group level

Function	Designated instructional level		
	Low	Middle	High
Responds	69	69	57
Initiates	31	31	43
(Total)	(100)	(100)	(100)

In brief, the picture gleaned from Tables 3 and 4 suggests that, regardless of group level, these classes were mostly organized in the traditional teacher-directed format with extensive use of lecture and limited use of peer interactions. Within this context of limited opportunities for talk, pupils in the high ability group had relatively more room to initiate interactions with the teacher and their peers.

These findings may be in part a result of the nature of the field of mathematics. This field may tend to support a traditional model of teaching in which the instructor is seen as the expert (by virtue of his or her knowledge) whose job it is to transmit a body of knowledge to the students. Given this model of teaching, it would be expected that the teacher dominate classroom talk.

Another possible explanation for these findings is that teachers in inner-city schools consider the teacher-directed instructional format best suited for their students. This second explanation is consistent with the claim made by Brophy (1982) that inner-city students, especially those of African American descent, profit from direct instruction.

Information on the types of interactions initiated by the teachers is summarized in Table 5. The table shows subtle but important differences among the groups. To the credit of the teachers in this study, most of the interactions initiated by them were academically oriented (informs, elicits, accepts, rejects). However, academic exchanges were significantly more frequent in the high group than in the low group. Specifically, academic exchanges comprised 80 percent of the teacher talk in the high group compared to 69 percent for the low group. Note that much of the variation among groups comes from the greater amount of informing in the high groups and the lesser amount in the low groups. On the other hand, teachers gave more directives and commented significantly more frequently on student behavior in the low groups.

Table 5

Percentage of teacher talk by function and group level

Function	Designated instructional level Low	Middle	High	
Academic-oriented variables				
Informs	30	39	41	
Elicits	33	29	32	
Accepts student ideas	5	6	6	
Rejects student ideas	1	1	1	
(Subgroup):	(69)	(75)	(80)	**
Procedure-oriented variable				
Directs	23	20	16	
Behavior-oriented variable				
Praise	2	1	1	
Criticizes	6	4	3	
(Subgroup):	(8)	(5)	(4)	***

* p=.10 ** p=.05 *** p=.01

The classroom observation schedule asked observers to give a general description of the lessons observed, including the types of mathematics being taught. This information is summarized in Table 6. The table shows that instruction dealing with fractions, decimals, and percentages was observed with high frequency in all groups. But an interesting pattern of differences emerged. Low ability students received significantly more basic arithmetic processes than their more advanced peers. In contrast, pupils in the high ability classes received significantly more instruction in algebra and were significantly more exposed to word problems than the less advanced students. Clearly, the students in the low ability group had less access to the type of knowledge (algebra) that prepares them for the academic track in high school. The cumulative effect of this differential access to knowledge is likely to have a profound impact on the students' future educational and career opportunities.

Table 6

Types of mathematics observed being taught
(Percentage of classes by instructional level)

Type	Designated instructional level		
	Low	Middle	High
Basic arithmetic processes	44	21	11 **
Fractions, decimals, percentage	56	59	42
Word problems	3	10	11 *
Algebra	3	16	44 ***
Geometry	9	5	16
Measurement	6	7	6

* p=.10 ** p=.05 *** p=.01

The findings presented in this portion of the paper regarding the types of interactions initiated by teachers and the content of instruction are consistent with previous research. In brief, they show that the students in the low achieving group had fewer academic opportunities than their high achieving counterparts. The findings suggest that rather than narrowing the gap between the groups, these interactional patterns accentuate the inequalities in skills and knowledge that may have been present when the pupils were originally assigned to their classes. These findings are alarming, but they are especially disconcerting given the overrepresentation of minority students in the low academic track.

Teachers' Interactions with White and Minority Students

Research suggests that teachers interact with students differentially--both verbally and nonverbally--based on race/ethnicity. For example, Aaron and Powell (1982) found that second grade teachers gave African American students significantly more negative responses to academic behaviors than they did white students. Irvine (1985) reported that the white students in her study received the majority of verbal praise while African American students received more verbal criticism. In addition, African American students received more negative feedback regarding their behavior and more dichotomous negative-positive feedback than their white peers. Similarly, Jackson and Cosca (1974) found that Mexican American pupils received significantly less teacher praise and encouragement, acceptance for their ideas, and noncriticizing teacher talk. Furthermore, the teachers questioned Mexican American students less frequently and gave them less positive feedback relative to white students.

Not all studies, however, support the notion that non-white students receive more negative treatment than their white peers. Hillman and Davenport (1978), for example, reported that African American students were involved in a greater proportion of classroom interactions than white students. But these interactions were both positive and negative. In addition to receiving more product questions and teacher feedback, the African American students received more criticism and teacher nonacceptance of questions or responses.

This section examines the interactions of the teachers in our study with the white and minority students in their classes. The results are summarized in Tables 7 through 11. For each variable, the frequency of interactions is reported in terms of per pupil measures. These measures represent the number of times during a 30 minute observation period that the average white and the average minority pupil were involved in interactions of each type. In each case, the classroom is the unit of analysis.

Interaction in the homogeneously grouped classes. Table 7 compares the per pupil interaction measures for white and minority students in the homogeneously grouped classes. The instructors initiated proportionately more interactions with minority students in all six teacher talk categories. Relative to white students, minority pup ls received more information, responded to more elicitations, and had their ideas accepted or used more frequently. Additionally, minority students responded to statements from the teacher and initiated interactions of their own with greater frequency than their white classmates. However, minority pupils were criticized more often and had more attention focused on their classroom demeanor.

At first glance, these interactional disparities appear to favor the minority students. Certainly, minority pupils had more opportunities to

interact with their teachers in comparison to the white students. But a closer examination of the table reveals a more complex picture. Of the six teacher-talk variables, only one is statistically significant. Thus, what can be said with confidence about the population from which this sample was drawn is that teachers are likely to give minority pupils more procedural directives. Put differently, the actions of minority students are likely to be more tightly controlled and more closely monitored relative to their white classmates.

To facilitate an understanding of the per pupil measures, the frequency of teacher talk for the type of interaction found to be statistically significant is plotted in Figure 1 by ethnic group relative to the white subgroup. The figure shows that for every procedural directive the teacher issued to the white students, minority students received nearly two directives.

The picture that emerges from these data is a complex one. Clearly, minority students played a major role in the interactions observed in these classrooms. Proportionately, these students were involved in more interactions with their teachers than white students. But, as Hillman and Davenport (1978) found previously, not all the interactions were positive. Most striking about these findings is that the statistically significant racial/ethnic difference dealt with procedures for getting work done, rather than the more academically oriented types of interactions.

Table 7

Average measures of per pupil interaction for individual white and minority students in the homogeneously grouped classes (N=64 classes)

Variables	Average white	Average minority	t value
Academic content variables-teacher-talk			
Teacher provides information to students	.150	.221	1.58
Teacher elicits information from students	.344	.352	0.86
Teacher accepts or uses students' ideas	.070	.091	1.55
Procedural variable-teacher-talk			
Teacher directs student behavior	.106	.176	2.02 **
Behavior variables-teacher-talk			
Teacher criticizes student behavior	.042	.053	0.79
All teacher talk focusing on student behavior (praise and/or criticism)	.050	.082	1.65
Student-talk variables			
Student talk - response	.106	.174	2.44 **
Student talk - initiate	.079	.133	1.22

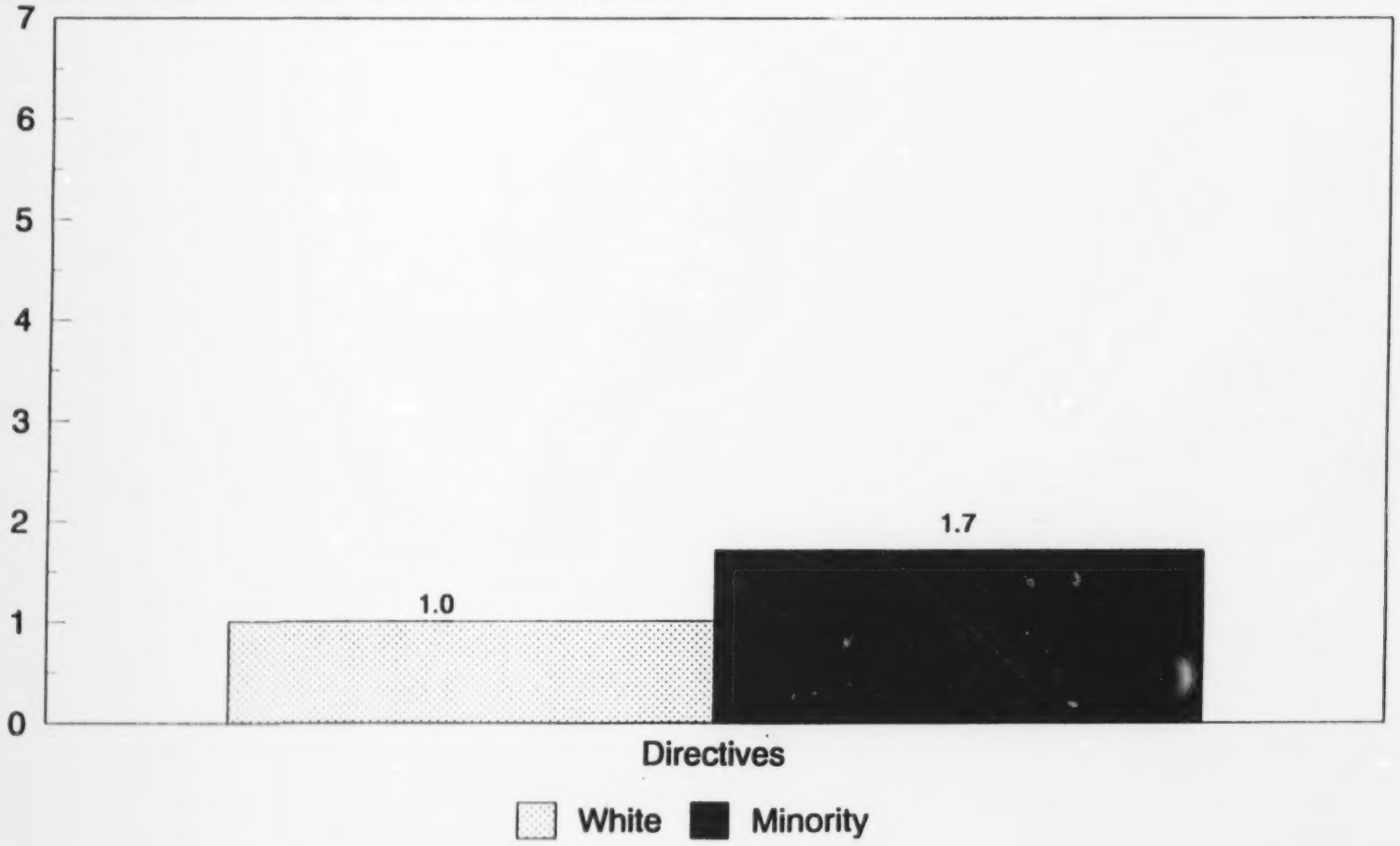
* Indicates that the disparities between white and minority students are statistically significant at p=.10. This means that for these disparities there are only 10 chances in 100 that corresponding disparities would not be found in the population from which the sample was drawn.

** p=.05

*** p=.01

Figure 1

Frequency of teacher talk type with statistical significance by ethnic group, relative to the White subgroup (All homogeneously grouped classes)



The interactional patterns described above for the homogeneously grouped classes varied somewhat across the low, middle, and high ability groups, as is evident from Tables 8 through 10. Overall, the more positive interactions between teachers and minority students occurred in the middle or average group. Less favorable exchanges were observed in the low and high groups.

Table 8 summarizes the results for the classes designated as low ability. Minority students in these classes interacted more frequently with their teachers on all variables of interest than did their white peers. But while benefitting from the frequency of interactions centering around academic content, they also spent more time on procedural and behavioral matters. Specifically, the teachers spent significantly more time telling minority students what to do than white students. There was significantly more teacher criticism of minority students than of white pupils. A significantly larger amount of teacher talk was directed toward the behavior of minority students than toward the behavior of their white peers. These statistically significant differences in teacher-talk are depicted visually in Figure 2. As the figure shows, for each directive given to a white student, three directives were given to minority pupils. For every teacher criticism of a white student there were five criticisms of minority students. For each behaviorally-oriented remark to a white student there were nearly six (5.9) such remarks to minority students.

One explanation that might be given for these differences is that minority youngsters do indeed require more procedural directives and more attention to classroom behavior in order to maintain their academic focus. However, these interactional differences may be at least in part a consequence of the teachers' conscious or unconscious low expectations of minority

Table 8

Average measures of per pupil interaction for individual white and minority students in classes designated as low ability (N=14 classes)

Variables	Average white	Average minority	t value
Academic content variables-teacher-talk			
Teacher provides information to students	.331	.378	0.50
Teacher elicits information from students	.542	.579	0.94
Teacher accepts or uses students' ideas	.086	.152	1.43
Procedural variable-teacher-talk			
Teacher directs student behavior	.105	.312	2.18 **
Behavior variables-teacher-talk			
Teacher criticizes student behavior	.026	.130	2.08 *
All teacher talk focusing on student behavior (praise and/or criticism)	.031	.183	2.98 ***
Student-talk variables			
Student talk - response	.051	.277	2.50 **
Student talk - initiate	.062	.311	1.50

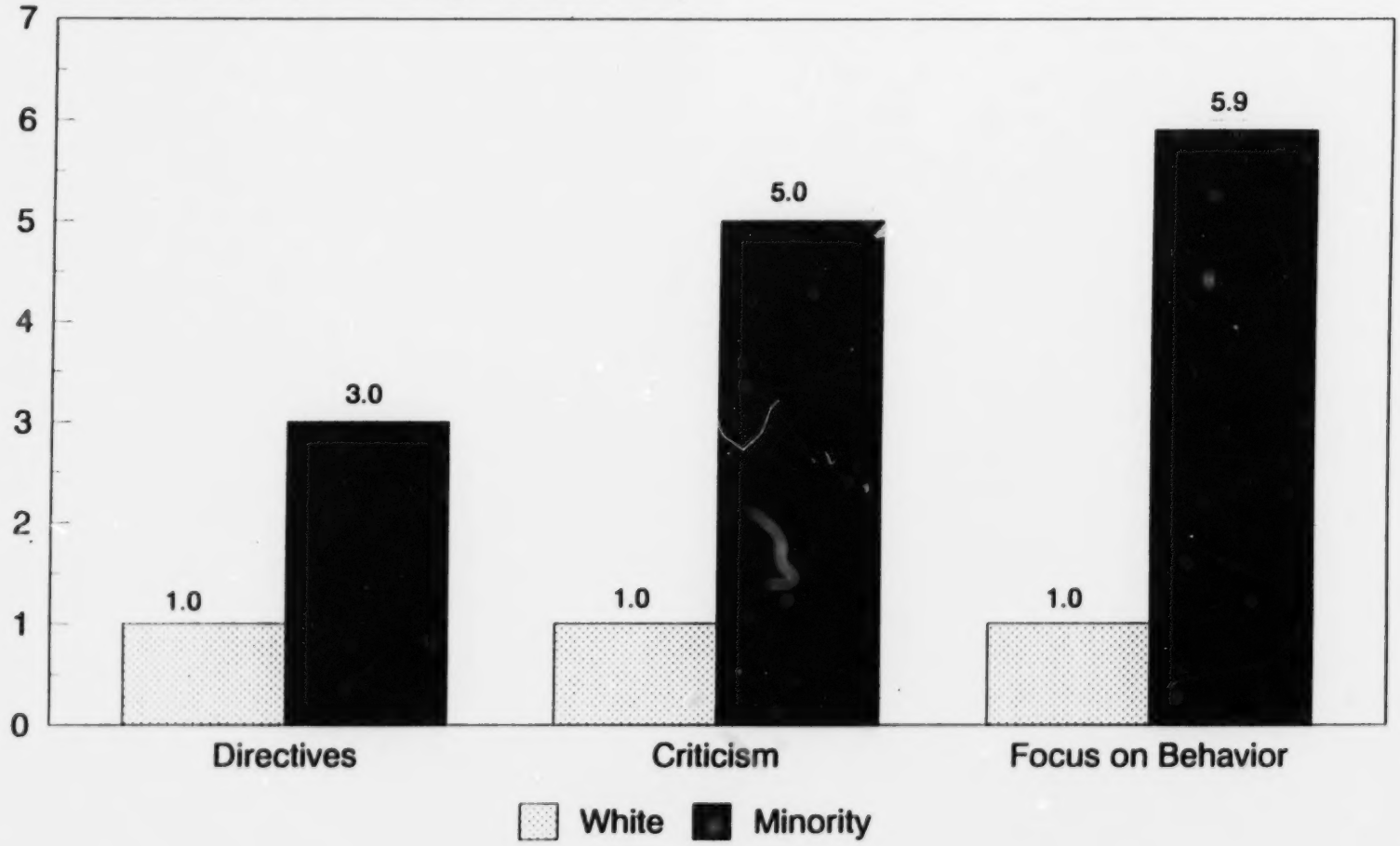
* Indicates that the disparities between white and minority students are statistically significant at p=.10. This means that for these disparities there are only 10 chances in 100 that corresponding disparities would not be found in the population from which the sample was drawn.

** p=.05

*** p=.01

Figure 2

Frequency of teacher talk type with statistical significance by ethnic group, relative to the White subgroup (Classes designated as low ability)



students. According to the literature, when teachers hold low expectations of students, they engage these students in interactions that are less conducive to learning (Braun, 1976; Datta, Schaeffer & Davis, 1968; Jensen & Rosenfeld, 1974). While we did not collect data on teacher expectations as part of this study, it is possible that a less favorable view of minority students led the teachers to believe that these students needed more procedural support and behavioral attention, especially when they had been placed in classes designated as "low ability."

Table 9 compares the interactions of teachers with white and minority pupils in the middle group. The table reveals that minority students engaged in more academically oriented interactions and fewer behavior oriented exchanges relative to their white counterparts. Only two variables were statistically significant, however. Teachers spent significantly more time giving information to and eliciting information from minority students than white pupils. These differences are depicted in Figure 3.

It is difficult to speculate about these findings for the middle group since they deviate somewhat from what is reported in the research literature as well as what we observed in the low and high ability groups. It is possible that the ethnic composition of the middle level classes contributed to these unexpected results. As was mentioned previously, of the three instructional groups the middle one was the most balanced ethnically, enrolling 36 percent of the white students and 41 percent of the minority students. This study, however, was not intended to examine possible links between the racial/ethnic composition of the class and the teacher-pupil interactions.

Table 9

Average measures of per pupil interaction for individual white and minority students in classes designated as middle ability (N=23 classes)

Variables	Average white	Average minority	t value
Academic content variables-teacher-talk			
Teacher provides information to students	.125	.325	2.63 **
Teacher elicits information from students	.338	.389	1.67 *
Teacher accepts or uses students' ideas	.070	.095	1.11
Procedural variable-teacher-talk			
Teacher directs student behavior	.111	.196	1.30
Behavior variables-teacher-talk			
Teacher criticizes student behavior	.065	.037	0.78
All teacher talk focusing on student behavior (praise and/or criticism)	.072	.061	0.16
Student-talk variables			
Student talk - response	.147	.159	0.36
Student talk - initiate	.085	.094	0.13

* Indicates that the disparities between white and minority students are statistically significant at p=.10. This means that for these disparities there are only 10 chances in 100 that corresponding disparities would not be found in the population from which the sample was drawn.

** p=.05

*** p=.01

Figure 3

Frequency of teacher talk type with statistical significance by ethnic group, relative to the White subgroup (Classes designated as middle or average ability)

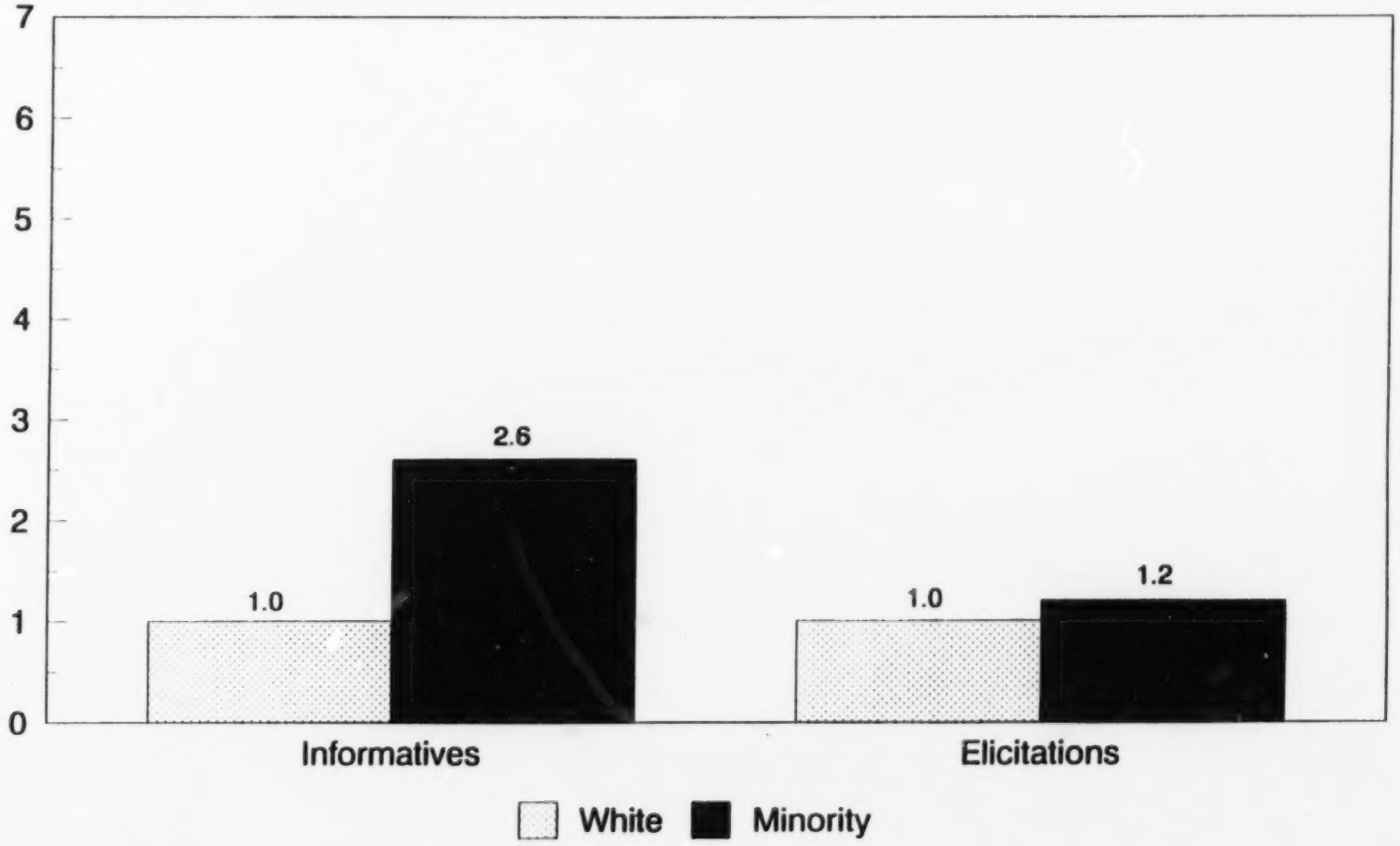


Table 10 compares the interactions of teachers with white and minority students in classes designated as high ability. The results show that the teachers initiated more academically oriented interactions with their white students. While issuing more procedural directives to the white pupils in their classes, the instructors more frequently focused on the behavior of the minority students. Furthermore, white students responded to fewer teacher statements but initiated more interactions of their own than minority students. These patterns are consistent with the research literature. However, our finding show statistically significant differences only for one variable--the amount of information given to the pupils. As Figure 4 reveals, teachers gave half as many informatives to high achieving minority students relative to their white counterparts.

In brief, the data presented here suggest that the minority students in this study received more favorable treatment than one would predict based on the research literature, especially those in the middle or average group. This should come as no surprise since these districts were identified (in consultation with the Edna McConell Clark Foundation) because of their demonstrated efforts to improve the educational opportunities of minority pupils. Nonetheless, disparities in the interactions of teachers with white and minority students were found. In general, the teachers were more controlling of minority pupils, especially of those in classes labeled as low ability.

Table 10

Average measures of per pupil interaction for individual white and minority students in classes designated as high ability (N=27 classes)

Variables	Average white	Average minority	t value
Academic content variables-teacher-talk			
Teacher provides information to students	.099	.054	1.65 *
Teacher elicits information from students	.268	.206	1.28
Teacher accepts or uses students' ideas	.063	.058	0.02
Procedural variable-teacher-talk			
Teacher directs student behavior	.102	.086	0.22
Behavior variables-teacher-talk			
Teacher criticizes student behavior	.029	.029	0.04
All teacher talk focusing on student behavior (praise and/or criticism)	.040	.051	0.78
Student-talk variables			
Student talk - response	.095	.134	1.51
Student talk - initiate	.080	.077	0.33

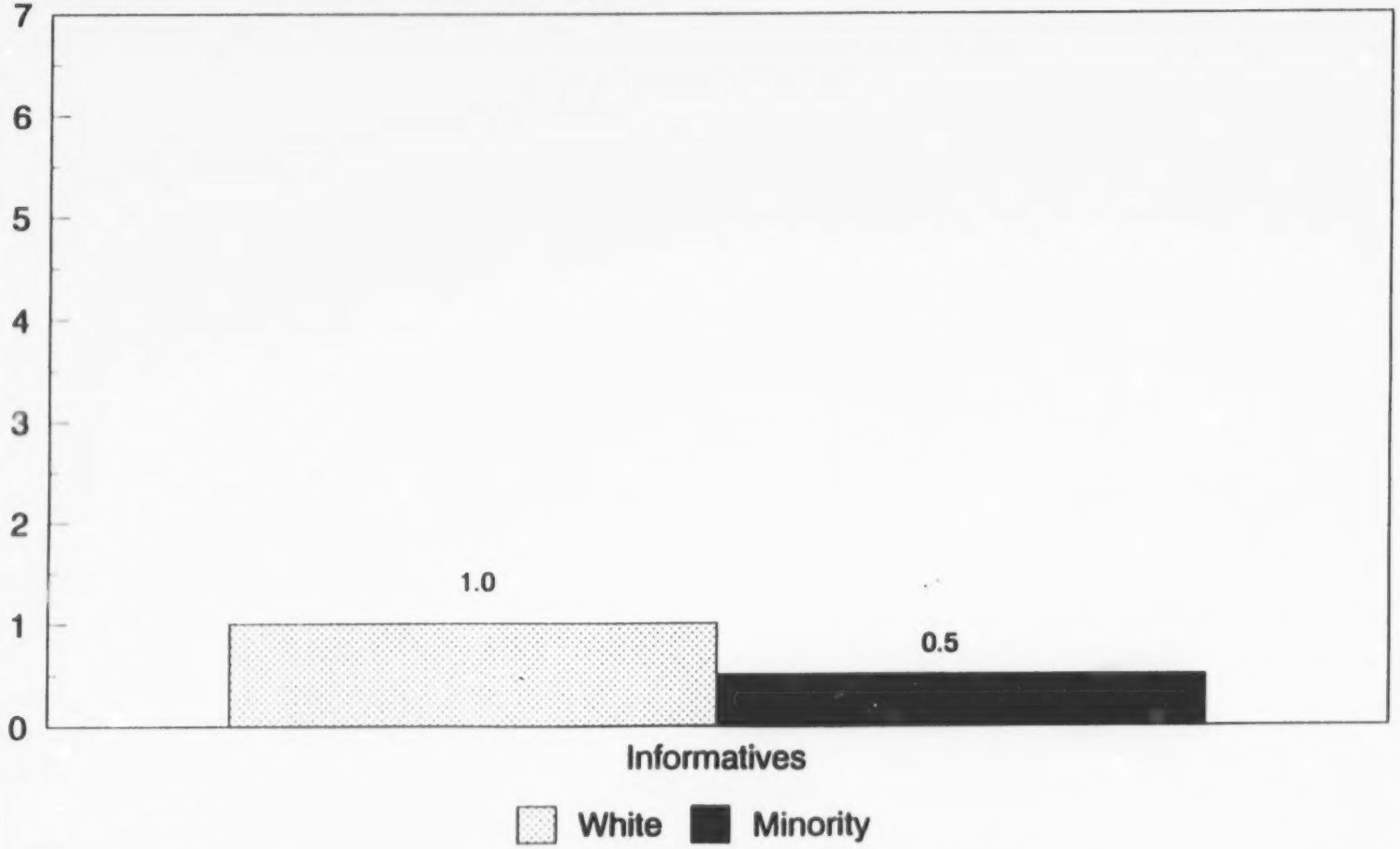
* Indicates that the disparities between white and minority students are statistically significant at p=.10. This means that for these disparities there are only 10 chances in 100 that corresponding disparities would not be found in the population from which the sample was drawn.

** p=.05

*** p=.01

Figure 4

Frequency of teacher talk type with statistical significance by ethnic group, relative to the White subgroup (Classes designated as high ability)



Interaction in the heterogeneously grouped classes. Table 11 shows the average per pupil measures for white and minority students in the heterogeneously grouped classes, by coding category. Again, there was a favorable pattern of interaction between teachers and their minority students. Specifically, minority students had an interactional advantage in the academic content variables compared to their white classmates. That is, the teacher elicited more information from these students, and used their ideas more frequently during instruction. While minority students responded to more statements from the teacher, their white peers initiated more of their own interactions. Interestingly, minority students received significantly fewer procedural directives and criticisms from the teacher than their white peers.

Figure 5 compares the interactional disparities with significant differences in the homogeneously and heterogeneously grouped classes. The figure makes it clear that the minority students in the heterogeneously grouped classes engaged in interactions that were less controlling and less behavior oriented, while the opposite pattern was found in the homogeneously grouped classes. It should be pointed out, however, that the heterogeneous classes participating in this study were all from a single district working to desegregate its schools for some time. This political pressure is likely to be reflected in the data we collected in those classrooms. Thus, the findings must be viewed cautiously, and should not be taken as representative of teacher-pupil interaction in heterogeneously grouped classes in general.

Table 11

Average measures of per pupil interaction for individual white and minority students in the heterogeneously grouped classes (N=10 classes)

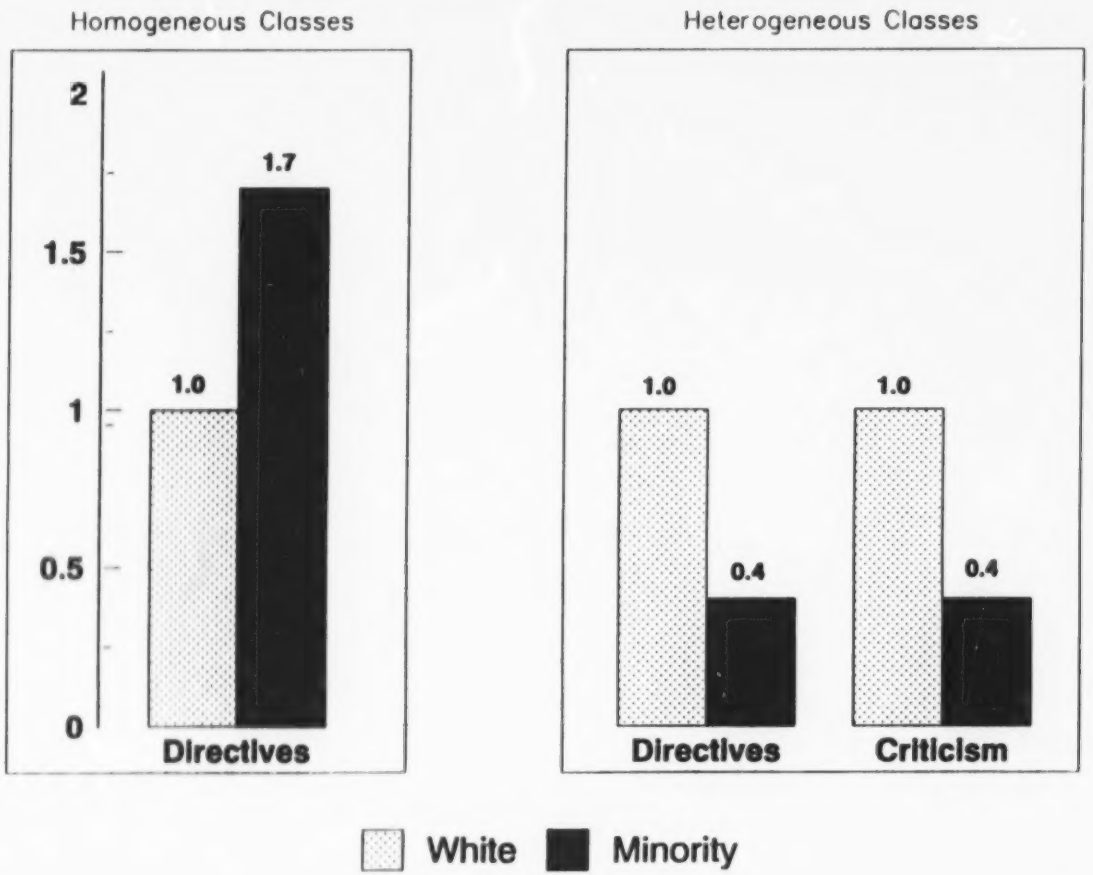
Variables	Average white	Average minority	t value
Academic content variables-teacher-talk			
Teacher provides information to students	.112	.064	0.96
Teacher elicits information from students	.125	.169	0.75
Teacher accepts or uses students' ideas	.029	.095	1.34
Procedural variable-teacher-talk			
.eacher directs student behavior	.143	.056	2.29 **
Behavior variables-teacher-talk			
Teacher criticizes student behavior	.040	.014	2.32 **
All teacher talk focusing on student behavior (praise and/or criticism)	.053	.050	0.17
Student-talk variables			
Student talk - response	.223	.246	0.45
Student talk - initiate	.159	.094	0.98

* Indicates that the disparities between white and minority students are statistically significant at p=.10. This means that for these disparities there are only 10 chances in 100 that corresponding disparities would not be found in the population from which the sample was drawn.

** p=.05

*** p=.01

Figure 5
Frequency of teacher talk type with statistical significance by ethnic group, relative to the White subgroup (Comparison of homogeneously and heterogeneously grouped classes)



Summary

The major findings presented in this paper were the following:

1. An academic hierarchy was clearly evident in five of the six school districts participating in this study. While school personnel did not use the traditional tracking labels of "low," "middle," and "high" ability groups, they nonetheless distinguished between and among students of varying levels of ability. Only one district used heterogeneous grouping for math instruction. There are indications, however, that the five districts that assigned pupils to math classes on the basis of ability are working to reduce the number of classes designated as low ability.

2. Minority students were overrepresented in the low level math classes and underrepresented in the high level classes.

3. There was a preponderance of teacher talk in all instructional groups.

4. Teachers exerted tight control over student talk in all instructional groups, but pupils in the high ability group initiated more interactions of their own than did their counterparts in the middle and low ability groups.

5. In all groups, verbal interaction centered mostly around academic content. However, academic content was more highly emphasized in the high ability group.

6. Procedures for getting work done and attention to student behavior was most pronounced in the low ability group.

7. While low ability classes spent considerable time on basic arithmetic, high ability classes were likely to be working on word problems and learning algebra.

8 In the homogeneously grouped classes, minority pupils interacted more frequently with their teachers relative to the white students. But not all these interactions were positive. Minority students received significantly more procedural directives from the teacher.

9. The level of instruction (low, middle, high) mediated the interactions between the teachers and their white and minority students. In comparison to their white classmates, minority pupils in the middle group received more favorable treatment from the teacher. But white students had an advantage over their minority peers in the low and high groups.

10. Relative to the white students, minority pupils had an interactional advantage in classes grouped heterogeneously, and a disadvantage in those grouped homogeneously.

References

Anyon, J. (1981). Social class and school knowledge. Curriculum Inquiry, 112(1), 3-42.

Aaron, R., & Powell, G. (1982). Feedback practices as a function of teacher and pupil race during reading group instruction. Journal of Negro Education, 51, 50-59.

Braun, C. (1976). Teacher expectations: Sociopsychological dynamics. Review of Educational Research, 46, 185-213.

Braddock II, J. H. (1989). Tracking of Black, Hispanic, Asian, Native American, and White Students: National patterns and trends. Baltimore, MD: Johns Hopkins University, Center for Research on Effective Schooling for Disadvantaged Students.

Brophy, J. E. (1982). Successful teaching strategies for the inner-city child. Phi Delta Kappan, 63(8), 527-530.

Cazden, C. B., & Mehan, H. (1989). Principles from sociology and anthropology: Context, code, classroom, and culture. In M. C. Reynolds (ED.), Knowledge base for the beginning teacher (pp. 47-57). Oxford: Pergamon Press.

Collins, J. (1986). Differential instruction in reading groups. In J. Cook-Gumperz (ED.), The social construction of literacy. Cambridge: Cambridge University Press.

Datta, L, Schaefer, E., & Davis, M. (1968). Sex and scholastic aptitude as variables in teachers' ratings of the adjustment and classroom behavior of Negro and other seventh grades students. Journal of Educational Psychology, 59, 94-101.

Ekstrom, R. (1991). Six urban School districts: Their Middle Grade Mathematics Grouping Policies and Practices. Paper prepared for the Symposium, "On the Right Track: The Consequences of Mathematics Course Placement, Policies and Practices in Middle Grades." American Educational Research Association, Chicago, Illinois, April 1991.

Gamoran, A., & Berends, M. (1987). The effects of stratification in secondary schools: Synthesis of survey and ethnographic research. Review of Educational Research, 57, 415-435.

Good, T. (1980). Classroom expectations: Teacher-pupil interactions. In J. H. McMillan (ED.), The social psychology of school learning (pp.79-122). New York: Academic Press

Hilliard, A. (1989). Teachers and cultural styles in a pluralistic society. NEA Today, 7, 65-69.

Hillman, S. B., & Davenport, G. G. (1978). Teacher-student interactions in desegregated schools. Journal of Educational Psychology, 70, 545-553.

Irvine, J. (1990). Beyond role models: The influence of Black teachers on Black students' achievement. Paper presented at the Educational Testing Service.

Irvine, J. (1989). Black students and school failure. Greenwood Press.

Irvine, J. J. (1985). Teacher communication patterns as related to the race and sex of the student. Journal of Educational Research, 78, 338-345.

Irvine, J. J. (1986). Teacher-student interactions: Effects of student race, sex and grade level. Journal of Educational Psychology, 78, 14-21.

Jackson, G., & Cosca, C. (1974). The inequality of educational opportunity in the southwest: An observational study of ethnically mixed classrooms. American Educational Research Journal, 11, 219-229.

Jensen, M., & Rosenfeld, L. B. (1974). Influence of mode of presentation, ethnicity, and social class on teachers' evaluations of students. Journal of Educational Psychology, 66, 540-547.

Leder, G. C. (1987a). Student achievement: A factor in classroom dynamics? The Exceptional Child, 34(2), 133-141.

Leder, G. C. (1987b). Teacher student interaction: A case study. Educational Studies in Mathematics, 18, 255-271.

Lehr, J. B. & Harris, H. W. (1988). At -risk, low-achieving students in the classroom. Washington, DC: NEAP

Metz, M. H. (1978). Classrooms and corridors: The crisis of authority in desegregated secondary schools. Berkeley, CA: University of California Press.

Moll, L. C. (1988). Some key issues in teaching Latino students. Language Arts, 65(5), 465-472.

Moll, L. C. (1986). Writing as communication: Creating strategic learning environments for students. Theory into Practice, 25(2), 102-108.

Oakes, J. (1986) Tracking, inequality, and the rhetoric of school reform: Why schools don't change. Journal of Education, 168(1), 60-80.

Oakes, J. (1985). Keeping track: How schools structure inequality. New Haven: Yale University Press.

Rist, R. (1970). Student social class and teacher expectations: The self-fulfilling prophecy in ghetto education. Harvard Educational Review, 40(3), 411-451.

Rubovits, P.C., & Maehr, M. L. (1973). Pygmalian black and white. Journal of Personality and Social Psychology, 25, 210-219.

Sells, L. W. (1981). The critical role of elementary school mathematics in equalizing opportunity. Arithmetic Teacher, 29 (1), 44-45.

Slavin, R. E. (1987). Effects of ability grouping on Black, Hispanic, and White students. Baltimore, MD: Johns Hopkins University, Center for Research on Elementary and Middle Schools and Center for Research on Elementary and Middle Schools and Center for Research on Effective Schooling of Disadvantaged Students.

Stage, E. (1989). Strategies and materials for meeting the needs of all students in math, science, technology and health. Paper commissioned by the California Curriculum Commission. Sacramento, CA.

Taylor, M. C. (1979). Race, sex, and the expression of self-fulfilling prophecies in a laboratory teaching situation. Journal of Personality and Social Psychology, 37, 897-912.

Winn, W., & Wilson, A. P. (1983). The affect and the effect of ability grouping. Contemporary Education, 54, 119-125.